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TENTH ANNUAL REPORT

OF THE

RECLAMATION SERVICE

1910-1911

F. H. NEWELL, DIRECTOR

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LETTERS OF TRANSMITTAL.

DEPARTMENT OF THE INTERIOR,
Washington, December 7, 1911.

SIR: In compliance with the provisions of section 2 of the act approved June 17, 1902, entitled "An act appropriating the receipts from the sale and disposal of public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands," I have the honor to transmit the accompanying Tenth Annual Report of the Reclamation Service.

Very respectfully,

WALTER L. FISHER,
Secretary.

The SPEAKER OF THE HOUSE OF REPRESENTATIVES.

DEPARTMENT OF THE INTERIOR,
UNITED STATES RECLAMATION SERVICE,
Washington, October 28, 1911.

SIR: Transmitted herewith is the Tenth Annual Report of the Reclamation Service. This report relates in particular to work completed and in progress during the fiscal year ending June 30, 1911, but contains also information in regard to previous operations in order that the methods, progress and results of reclamation work may be more readily understood.

Very respectfully,

A. P. DAVIS, *Acting Director.*

The SECRETARY OF THE INTERIOR.

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TENTH ANNUAL REPORT

OF THE

RECLAMATION SERVICE

F. H. NEWELL, *Director*

GENERAL DISCUSSION

LEGISLATION

GENERAL STATEMENT

The reclamation act and acts of Congress affecting the operations thereunder have been printed in the fifth, sixth, seventh, eighth, and ninth annual reports. For convenience of reference the reclamation act is here reprinted together with laws affecting operations thereunder that have not heretofore been printed in the annual reports.

RECLAMATION ACT

An Act Appropriating the Receipts from the Sale and Disposal of Public Lands in Certain States and Territories to the Construction of Irrigation Works for the Reclamation of Arid Lands

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That all moneys received from the sale and disposal of public lands in Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Utah, Washington, and Wyoming, beginning with the fiscal year ending June thirtieth, nineteen hundred and one, including the surplus of fees and commissions in excess of allowances to registers and receivers, and excepting the five per centum of the proceeds of the sales of public lands in the above States set aside by law for educational and other purposes, shall be, and the same are hereby, reserved, set aside, and appropriated as a special fund in the Treasury to be known as the "reclamation fund," to be used in the examination and survey for and the construction and maintenance of irrigation works for the storage, diversion, and development of waters for the reclamation of arid and semiarid lands in the said States and Territories, and for the payment of all other expenditures provided for in this act: *Provided,* That in case the receipts from the sale and disposal of public lands other than those realized from the sale and disposal of lands referred to in this section are insufficient to meet the requirements for the support of agricultural colleges in the several

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States and Territories, under the act of August thirtieth, eighteen hundred and ninety, entitled "An act to apply a portion of the proceeds of the public lands to the more complete endowment and support of the colleges for the benefit of agriculture and the mechanic arts, established under the provisions of an act of Congress approved July second, eighteen hundred and sixty-two," the deficiency, if any, in the sum necessary for the support of the said colleges shall be provided for from any moneys in the Treasury not otherwise appropriated.

SEC. 2. That the Secretary of the Interior is hereby authorized and directed to make examinations and surveys for, and to locate and construct, as herein provided, irrigation works for the storage, diversion, and development of waters, including artesian wells, and to report to Congress at the beginning of each regular session as to the results of such examinations and surveys, giving estimates of cost of all contemplated works, the quantity and location of the lands which can be irrigated therefrom, and all facts relative to the practicability of each irrigation project; also the cost of works in process of construction as well as of those which have been completed.

SEC. 3. That the Secretary of the Interior shall, before giving the public notice provided for in section four of this act, withdraw from public entry the lands required for any irrigation works contemplated under the provisions of this act, and shall restore to public entry any of the lands so withdrawn when, in his judgment, such lands are not required for the purposes of this act; and the Secretary of the Interior is hereby authorized, at or immediately prior to the time of beginning the surveys for any contemplated irrigation works, to withdraw from entry, except under the homestead laws, any public lands believed to be susceptible of irrigation from said works: *Provided*, That all lands entered and entries made under the homestead laws within areas so withdrawn during such withdrawal shall be subject to all the provisions, limitations, charges, terms, and conditions of this act; that said surveys shall be prosecuted diligently to completion, and upon the completion thereof, and of the necessary maps, plans, and estimates of cost, the Secretary of the Interior shall determine whether or not said project is practicable and advisable, and if determined to be impracticable or unadvisable he shall thereupon restore said land to entry; that public lands which it is proposed to irrigate by means of any contemplated works shall be subject to entry only under the provisions of the homestead laws in tracts of not less than forty nor more than one hundred and sixty acres, and shall be subject to the limitations, charges, terms, and conditions herein provided: *Provided*, That the commutation provisions of the homestead laws shall not apply to entries made under this act.

SEC. 4. That upon the determination by the Secretary of the Interior that any irrigation project is practicable, he may cause to be let contracts for the construction of the same, in such portions or sections as it may be practicable to construct and complete as parts of the whole project, providing the necessary funds for such portions or sections are available in the reclamation fund, and thereupon he shall give public notice of the lands irrigable under such project, and limit of area per entry, which limit shall represent the acreage which, in the opinion of the Secretary, may be reasonably required for the support of a family upon the lands in question; also of the charges

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which shall be made per acre upon the said entries, and upon lands in private ownership which may be irrigated by the waters of the said irrigation project, and the number of annual installments, not exceeding ten, in which such charges shall be paid and the time when such payments shall commence. The said charges shall be determined with a view of returning to the reclamation fund the estimated cost of construction of the project, and shall be apportioned equitably: *Provided*, That in all construction work eight hours shall constitute a day's work, and no Mongolian labor shall be employed thereon.

SEC. 5. That the entryman upon lands to be irrigated by such works shall, in addition to compliance with the homestead laws, reclaim at least one-half of the total irrigable area of his entry for agricultural purposes, and before receiving patent for the lands covered by his entry shall pay to the Government the charges apportioned against such tract, as provided in section 4. No right to the use of water for land in private ownership shall be sold for a tract exceeding one hundred and sixty acres to any one landowner, and no such sale shall be made to any landowner unless he be an actual bona fide resident on such land, or occupant thereof residing in the neighborhood of said land, and no such right shall permanently attach until all payments therefor are made. The annual installments shall be paid to the receiver of the local land office of the district in which the land is situated, and a failure to make any two payments when due shall render the entry subject to cancellation, with the forfeiture of all rights under this act, as well as of any moneys already paid thereon. All moneys received from the above sources shall be paid into the reclamation fund. Registers and receivers shall be allowed the usual commissions on all moneys paid for lands entered under this act.

SEC. 6. That the Secretary of the Interior is hereby authorized and directed to use the reclamation fund for the operation and maintenance of all reservoirs and irrigation works constructed under the provisions of this act: *Provided*, That when the payments required by this act are made for the major portion of the lands irrigated from the waters of any of the works herein provided for, then the management and operation of such irrigation works shall pass to the owners of the lands irrigated thereby, to be maintained at their expense under such form of organization and under such rules and regulations as may be acceptable to the Secretary of the Interior: *Provided*, That the title to and the management and operation of the reservoirs and the works necessary for their protection and operation shall remain in the Government until otherwise provided by Congress.

SEC. 7. That where in carrying out the provisions of this act it becomes necessary to acquire any rights or property, the Secretary of the Interior is hereby authorized to acquire the same for the United States by purchase or by condemnation under judicial process, and to pay from the reclamation fund the sums which may be needed for that purpose, and it shall be the duty of the Attorney General of the United States upon every application of the Secretary of the Interior, under this act, to cause proceedings to be commenced for condemnation within thirty days from the receipt of the application at the Department of Justice.

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SEC. 8. That nothing in this act shall be construed as affecting or intended to affect or to in any way interfere with the laws of any State or Territory relating to the control, appropriation, use, or distribution of water used in irrigation, or any vested right acquired thereunder, and the Secretary of the Interior, in carrying out the provisions of this act, shall proceed in conformity with such laws, and nothing herein shall in any way affect any right of any State or of the Federal Government or of any landowner, appropriator, or user of water in, to, or from any interstate stream or the waters thereof: *Provided*, That the right to the use of water acquired under the provisions of this act shall be appurtenant to the land irrigated, and beneficial use shall be the basis, the measure, and the limit of the right.

SEC. 9.[1] That it is hereby declared to be the duty of the Secretary of the Interior in carrying out the provisions of this act, so far as the same may be practicable and subject to the existence of feasible irrigation projects, to expend the major portion of the funds arising from the sale of public lands within each State and Territory hereinbefore named for the benefit of arid and semiarid lands within the limits of such State or Territory: *Provided*, That the Secretary may temporarily use such portion of said funds for the benefit of arid or semiarid lands in any particular State or Territory hereinbefore named as he may deem advisable, but when so used the excess shall be restored to the fund as soon as practicable, to the end that ultimately, and in any event, within each ten-year period after the passage of this act, the expenditures for the benefit of the said States and Territories shall be equalized according to the proportions and subject to the conditions as to practicability and feasibility aforesaid.

SEC. 10. That the Secretary of the Interior is hereby authorized to perform any and all acts and to make such rules and regulations as may be necessary and proper for the purpose of carrying the provisions of this act into full force and effect.

Approved, June 17, 1902. (32 Stat., 388.)

RELINQUISHMENT OF SECOND-FORM LANDS

An Act To Amend Section Five of the Act of Congress of June Twenty-Fifth, Nineteen Hundred and Ten, Entitled "An Act to Authorize Advances to the 'Reclamation Fund,' and for the Issue and Disposal of Certificates of Indebtedness in Reimbursement Therefor, and for Other Purposes"

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section five of an act entitled "An act to authorize advances to the 'reclamation fund,' and for the issue and disposal of certificates of indebtedness in reimbursement therefor, and for other purposes," approved June twenty-fifth, nineteen hundred and ten (Thirty-sixth Statutes at Large, page eight hundred and thirty-five), be, and the same hereby is, amended as follows:

"SEC. 5. That no entry shall be hereafter made and no entryman shall be permitted to go upon lands reserved for irrigation purposes until the Secretary of the Interior shall have established the unit of acreage and fixed the water charges and the date when the water can

[1] Sec. 9 of the reclamation act is repealed by sec. 6 of the act of Congress approved June 25, 1910 (36 Stat. L., 835).

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be applied and make public announcement of the same: *Provided*, That where entries made prior to June twenty-fifth, nineteen hundred and ten, have been or may be relinquished in whole or in part, the lands so relinquished shall be subject to settlement and entry under the homestead law as amended by an act entitled 'An act appropriating the receipts from the sale and disposal of the public lands in certain States and Territories to the construction of irrigation works for the reclamation of arid lands,' approved June seventeenth, nineteen hundred and two (Thirty-second Statutes at Large, page three hundred and eighty-eight)."

Approved, February 18, 1911. (36 Stat. L., 917.)

PUBLIC NOTICES AND WATER-RIGHT APPLICATIONS

[Curtis Act]

An Act To Authorize the Secretary of the Interior to Withdraw Public Notices Issued Under Section Four of the Reclamation Act, and for Other Purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Secretary of the Interior may, in his discretion, withdraw any public notice heretofore issued under section four of the reclamation act of June seventeenth, nineteen hundred and two, and he may agree to such modification of water-right applications heretofore duly filed or contracts with water users' associations and others, entered into prior to the passage of this act, as he may deem advisable, or he may consent to the abrogation of such water-right applications and contracts, and proceed in all respects as if no such notice had been given.

Approved, February 13, 1911. (36 Stat. L., 902.)

LEASING SURPLUS POWER AND POWER PRIVILEGES

An Act To Amend an Act Entitled "An Act Providing for the Withdrawal from Public Entry of Lands Needed for Town-site Purposes in Connection with Irrigation Projects Under the Reclamation Act of June Seventeenth, Nineteenth Hundred and Two, and for Other Purposes," Approved April Sixteenth, Nineteen Hundred and Six.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That section five of an act entitled "An act providing for the withdrawal from public entry of lands needed for town-site purposes in connection with irrigation projects under the reclamation act of June seventeenth, nineteen hundred and two, and for other purposes," approved April sixteenth, nineteen hundred and six, be amended so as to read as follows:

"SEC. 5. That whenever a development of power is necessary for the irrigation of lands, under any project undertaken under the said reclamation act, or an opportunity is afforded for the development of power under any such project, the Secretary of the Interior is authorized to lease for a period not exceeding ten years, giving preference to municipal purposes, any surplus power or power privilege, and the money derived from such leases shall be covered into the reclamation fund and be placed to the credit of the roject from which such power is derived: *Provided*, That no lease shall be made of such surplus power or power privileges as will impair the effi-

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ciency of the irrigation project: *Provided further*, That the Secretary of the Interior is authorized, in his discretion, to make such a lease in connection with Rio Grande project in Texas and New Mexico for a longer period not exceeding fifty years, with the approval of the water users' association or associations under any such project, organized in conformity with the rules and regulations prescribed by the Secretary of the Interior in pursuance of section six of the reclamation act approved June seventeenth, nineteen hundred and two."

Approved, February 24, 1911. (36 Stat. L., 930.)

DISPOSITION OF SURPLUS WATERS AND COOPERATION IN CONSTRUCTION

[Warren Act]

An Act To Authorize the Government to Contract for Impounding, Storing, and Carriage of Water, and to Cooperate in the Construction and Use of Reservoirs and Canals Under Reclamation Projects, and for Other Purposes

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That whenever in carrying out the provisions of the reclamation law, storage or carrying capacity has been or may be provided in excess of the requirements of the lands to be irrigated under any project, the Secretary of the Interior, preserving a first right to lands and entrymen under the project, is hereby authorized, upon such terms as he may determine to be just and equitable, to contract for the impounding, storage, and carriage of water to an extent not exceeding such excess capacity with irrigation systems operating under the act of August eighteenth, eighteen hundred and ninety-four, known as the Carey Act, and individuals, corporations, associations, and irrigation districts organized for or engaged in furnishing or in distributing water for irrigation. Water so impounded, stored, or carried under any such contract shall be for the purpose of distribution to individual water users by the party with whom the contract is made: *Provided, however*, That water so impounded, stored, or carried shall not be used otherwise than as prescribed by law as to lands held in private ownership within Government reclamation projects. In fixing the charges under any such contract for impounding, storing, or carrying water for any irrigation system, corporation, association, district, or individual, as herein provided, the Secretary shall take into consideration the cost of construction and maintenance of the reservoir by which such water is to be impounded or stored and the canal by which it is to be carried and such charges shall be just and equitable as to water users under the Government project. No irrigation system, district, association, corporation, or individual so contracting shall make any charge for the storage, carriage, or delivery of such water in excess of the charge paid to the United States except to such extent as may be reasonably necessary to cover cost of carriage and delivery of such water through their works.

SEC. 2. That in carrying out the provisions of said reclamation act and acts amendatory thereof or supplementary thereto, the Secretary of the Interior is authorized, upon such terms as may be agreed upon, to cooperate with irrigation districts, water users' associations, cor-

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porations, entrymen, or water users for the construction or use of such reservoirs, canals, or ditches as may be advantageously used by the Government and irrigation districts, water users' associations, corporations, entrymen, or water users for impounding, delivering, and carrying water for irrigation purposes: *Provided*, That the title to and management of the works so constructed shall be subject to the provisions of section six of said act: *Provided further*, That water shall not be furnished from any such reservoir or delivered through any such canal or ditch to any one landowner in excess of an amount sufficient to irrigate one hundred and sixty acres: *Provided*, That nothing contained in this act shall be held or construed as enlarging or attempting to enlarge the right of the United States, under existing law, to control the waters of any stream in any State.

SEC. 3. That the moneys received in pursuance of such contracts shall be covered into the reclamation fund and be available for use under the terms of the reclamation act and the acts amendatory thereof or supplementary thereto.

Approved, February 21, 1911. (36 Stat. L., 925.)

SALE OF LANDS ACQUIRED UNDER THE RECLAMATION ACT

An Act To Provide for the Sale of Lands Acquired Under the Provisions of the Reclamation Act and Which Are not Needed for the Purposes of That Act

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That whenever in the opinion of the Secretary of the Interior any lands which have been acquired under the provisions of the act of June seventeenth, nineteen hundred and two (Thirty-second Statutes, page three hundred and eighty-eight), commonly called the "reclamation act," or under the provisions of any act amendatory thereof or supplementary thereto, for any irrigation works contemplated by said reclamation act are not needed for the purposes for which they were acquired, said Secretary of the Interior may cause said lands, together with the improvements thereon, to be appraised by three disinterested persons, to be appointed by him, and thereafter to sell the same, for not less than the appraised value at public auction to the highest bidder, after giving public notice of the time and place of sale by posting upon the land and by publication for not less than thirty days in a newspaper of general circulation in the vicinity of the land.

SEC. 2. That upon payment of the purchase price, the Secretary of the Interior is authorized by appropriate deed to convey all the right, title, and interest of the United States of, in, and to said lands to the purchaser at said sale, subject, however, to such reservations, limitations, or conditions as said Secretary may deem proper: *Provided*, That not over one hundred and sixty acres shall be sold to any one person.

SEC. 3. That the moneys derived from the sale of such lands shall be covered into the reclamation fund and be placed to the credit of the project for which such lands had been acquired.

Approved, February 2, 1911. (36 Stat. L., 895.)

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DECISIONS OF THE SECRETARY OF THE INTERIOR

GENERAL STATEMENT

Below is given under suitable headings a digest of important decisions which have been rendered by the Secretary of the Interior during the past year relating to operations under the reclamation act:

LEASE OF GRAZING LANDS ACQUIRED THROUGH CONDEMNATION PROCEEDINGS

Temporary leases for grazing and other agricultural purposes may be made of lands acquired through condemnation proceedings for reservoir or canal purposes during the period which may elapse between the acquisition of title and the actual use of the same for reservoirs or canals. All such leases should state the purpose for which the lands were acquired, that such purpose will not in any way be interfered with or delayed by the proposed lease, and should specifically provide in each case for the immediate or speedy termination of the lease in the event that it is desired to use the land or any part thereof for reclamation purposes or in the event that the work of reclamation is found to be hindered or delayed by reason of the lease. The lease should be limited to a period of one year, but there would be no objection to incorporating therein a provision giving the lessee the right to renew the same for the following year in the event the lands are not sooner needed by the United States for reclamation works. (Secretary, Feb. 28, 1911, 39 L. D., 525.)

DESERT-LAND ENTRIES

Under the desert-land act as modified by the act of June 27, 1906, final proof upon a desert-land entry within a reclamation project can not be held to have been made and completed until the payment required by those acts and the reclamation act of June 17, 1902, has been made. The department is without authority to accept or regard final proof in such cases as complete or to issue patent thereon until after full compliance with the terms of payment imposed by the reclamation act. If, however, the parties in interest are able to negotiate loans for amounts sufficient to pay the entire reclamation charges upon any entry contingent upon the prompt issuance of final certificate and patent, the consideration of the final proof and issuance of final certificate and patent in cases otherwise regular may be expedited. (First Assistant Secretary, Feb. 24, 1911, 39 L. D., 519.)

A desert-land entryman whose land is included within a reclamation project may elect to proceed with the reclamation thereof on his own account, and thus acquire title to all or so much of the land included within his entry as he can secure water to irrigate or he may accept the conditions of the reclamation act and acquire title thereunder to 160 acres. He can not, however, avail himself of both the waters of the reclamation project and other means of reclamation, and thus acquire title to more than 160 acres of land. (First Assistant Secretary, Dec. 6, 1910, 39 L. D., 380.)

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HOMESTEAD ENTRIES

Where a homestead entry within a reclamation project is divided into farm units, the entryman is entitled to retain only one of such units to be designated by him, and as to the remaining units, the entry must be canceled or where satisfactory final proof has been submitted, assignment thereof may be made under the provisions of the act of June 23, 1910. (Secretary, Oct. 19, 1910, 39 L. D., 297.)

Where a homestead entry is made subject to the provisions of the reclamation act and a portion of the entry is subsequently eliminated from the project and the portion remaining within the project is designated as a farm unit, the entryman may retain either the farm unit or the portion lying without the limits of the project, at his election, and the entry will be canceled as to the remainder. (First Assistant Secretary, Feb. 21, 1911, 39 L. D., 502.)

Where a widow succeeds to the right of her husband in an unperfected homestead entry, the fact that she had previously secured water from the project for the reclamation of land held by her in private ownership does not affect her right to acquire water under the project for completion of such entry under the reclamation act. (First Assistant Secretary, May 29, 1911, 40 L. D., 116.)

ASSIGNMENT

A married woman may, under the act of June 23, 1910, take an assignment of homestead entry made under the reclamation act upon which satisfactory final proof of residence and cultivation has been made, but upon which not all of the water-right charges have been paid, provided the local laws permit a married woman to purchase and hold real estate. In addition to the usual requirements, however, she will be required to show that the purchase is made with her own separate means in which her husband has no interest or claim, that the assignment is not taken for the use or benefit of her husband, and that she has no agreement or understanding by which any interest therein will inure to his benefit, and that the water right thus sought, together with such other rights as may be already in possession by such assignee, will not aggregate water rights for more than 160 acres of land furnished under the reclamation act. (Secretary Feb. 21, 1911, 39 L. D., 504.)

WATER-RIGHT CHARGES

An applicant for water rights under a reclamation project is required to pay for water for the entire irrigable area of his entry as shown on the plat, and where mistake in the plat is alleged as to the irrigable area of the entry, application for correction thereof should be made to the local officer of the Reclamation Service. (First Assistant Secretary, June 4, 1910, 39 L. D., 2.)

IRRIGABLE AREA

No deduction from the irrigable area subject to water-right charges will be made on account of right of way for highways or irrigating ditches. (First Assistant Secretary, June 4, 1910, 39 L. D., 2.)

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APPEALS

The instructions of June 27, 1910, providing for appeals from the action of a project engineer to the Director of the Reclamation Service and the Secretary of the Interior, successively, are applicable only to cases involving questions which properly rest for decision within the jurisdiction of the Reclamation Service. (First Assistant Secretary, May 29, 1911, 40 L. D., 116.)

WATER RIGHT

Upon the issuance of a certificate of water-right application the right evidenced thereby becomes appurtenant to the land, subject to forfeiture for failure to pay the annual installments at the time and in the manner prescribed by law and the regulations. A subsequent purchaser of the land succeeds to the rights and status of the original owner, subject to the same charges and conditions. (First Assistant Secretary, Mar. 20, 1911, 39 L. D., 580.)

FURNISHING WATER TO TOWN LOTS

Applications by individual lot owners for water rights under the reclamation act for lands which have been subdivided into town lots will not be allowed. Water may be supplied to towns from reclamation projects, but delivered to some convenient point to be handled and distributed to the inhabitants by the municipal authorities in accordance with the provisions of the act of April 16, 1906. (Secretary, Mar. 21, 1911, 39 L. D., 591.)

RIGHTS OF WAY

The evident purpose of the act of August 30, 1890 (26 Stat., 391), was to reserve to the United States such lands as might be needed in the prosecution and furtherance of the plan of reclamation subsequently outlined by legislation of Congress. All public lands west of the one hundredth meridian taken up under allotment, sale, homestead, or other form of disposition, subsequent to said act as to which there is no claim by reason of settlement, occupancy, or otherwise, prior to that date are subject to the reservation provided for by that act to be expressed in the patent for right of way for ditches or canals constructed by authority of the United States. (First Assistant Secretary, Apr. 12, 1911, 40 L. D., 28.)

VESTED RIGHT

The rule that 160 acres is the maximum for which a water right may be acquired under the reclamation act does not prevent the recognition of a vested right for a larger area and protection of the same by allowing the continual flowing of the water covered by such right through the works constructed by the United States under appropriate regulations and charges. (First Assistant Secretary, May 29, 1911, 40 L. D., 116.)

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FUNDS DERIVED IN PURSUANCE OF THE ACT OF JUNE 25, 1910

Money derived under the provisions of the act of Congress approved June 25, 1910, authorizing advances to the reclamation fund may be used for extensions of existing projects under the terms and upon the conditions prescribed by section 1 of the said act. (Secretary, Nov. 21, 1910.)

LITIGATION

COLORADO, GRAND VALLEY PROJECT

The taking of testimony in the proceedings to adjudicate the priorities of water rights in district No. 42, Mesa County, Colo. (which district includes the Grand Valley project and its supply canal), was completed early in the year, and the referee's report in the case was submitted April 15, 1911. Exceptions were filed by the attorneys for the United States to the excessive amount of water reported for decree to adverse claimants. On June 30 the judge had not yet set a date for hearing argument on the exceptions.

COLORADO, UNCOMPAHGRE VALLEY PROJECT

In the suit instituted in the District Court of the State of Colorado, for the adjudication of water rights in water district No. 40, affecting the Uncompahgre Valley project, a statement of the claims of the United States has been filed, but the proceedings will not be closed until some time in the fall of 1911 or later. Hearings for the presentation of evidence by the various claimants have been held from time to time. The United States has not yet presented evidence in support of its claim, but will do so whenever called on by the referee.

In the suit for the adjudication of water rights in district No. 62, on April 25, 1910, the court ordered an adjudication of water rights and appointed a referee. A statement of claim on behalf of the United States has been filed, and hearings will be had from time to time during the summer of 1911 and the proceedings may possibly be closed at the fall term of court.

On March 7, 1911, condemnation proceedings were commenced in the United States District Court for the District of Colorado against Aylmer F. Reeves to secure a strip of land for canal right of way across the northwest quarter of the southwest quarter (NW. ¼ SW. ¼) of section 21, township 49 north, range 10 west, N. M. P. M., for the King lateral extension ditch. On May 7, 1911, an order giving the United States immediate possession of the premises sought to be condemned was filed. On May 6, 1911, the respondent, Aylmer F. Reeves, filed a reply, which, among other things, raises the question of the constitutionality of the reclamation act. Reply of the United States was filed June 13, 1911. The cause may be tried at the fall term of the United States District Court, sitting at Montrose, Colo.

IDAHO, BOISE PROJECT

On July 5, 1910, the United States Circuit Court of Appeals rendered its decision in the condemnation suit against David E. Burley, upholding the constitutionality of the reclamation act in its application to both public and private lands. (179 Fed., 1.) Right of appeal has been lost.

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Suit was commenced February 2, 1911, in the United States Circuit Court against the Highland Valley Power Co. et al. to quiet title to certain reservoir and canal right of way lands, and on March 3, 1911, the Highland Valley Power Co. entered its appearance.

In the early part of May, 1911, condemnation proceedings were commenced against lands of Andrew Dowling et al. for railroad right of way in connection with the Arrowrock Dam. Subsequently contract to purchase was entered into and approved.

September 26, 1910, the United States Circuit Court decreed the forfeiture of reservoir site by the defendants in the case of the United States *v.* W. Grant Whitney. Notice of appeal has been given.

IDAHO, MINIDOKA PROJECT

The appeal in the case of the United States *v.* Minidoka & Southwestern Railway Co. et al. (176 Fed., 762) to enjoin defendants from constructing its line across withdrawn land without compliance with conditions was argued February 15, 1911, and the court has the case now under advisement.

January 28, 1911, the Supreme Court of Idaho sustained the temporary restraining order of the lower court in the case of the Minidoka & Southwestern Railway Co. *v.* F. E. Weymouth et al., prohibiting defendants who, though not so described in the complaint, are officers of the Reclamation Service from constructing canals or other works on plaintiff's right of way.

On March 17, 1911, Jesse S. Plain commenced action in the State court against P. F. Horne et al. (being register and receiver of the land office and the officers of the Reclamation Service) to restrain defendants from extending on the books of the land office and the Reclamation Service any assessments in excess of $26 for charges for the irrigation season and from shutting off water for the nonpayment of any excess charge. March 28 the case was dismissed for lack of jurisdiction.

On March 31, 1911, similar action was commenced by the same plaintiff against the same defendants in the United States Circuit Court. The court dismissed the case for lack of jurisdiction.

The suit of Twin Falls Canal Co. *v.* Charles N. Foster et al. is an action to determine the priorities to the waters of Snake River, and nearly all applicants for water under the project were joined as defendants. On June 21, 1911, the District Court of Idaho overruled the motion of the defendants, settlers under the Minidoka project, to dismiss as to them.

September 14, 1910, three actions were commenced in the United States Circuit Court against W. T. Johns, L. C. Johnson and W. B. Morgart, respectively, for injunction restraining the respective defendants from unlawful use of the waters of the project. September 21, 1910, temporary restraining orders were issued in each case.

MONTANA, HUNTLEY PROJECT

On August 31, 1909, an action was instituted in the United States Circuit Court for the District of Colorado by the United States against Piper Bros. Co., and Whitney Newton and George A. Newton, their bondsmen, for the recovery of extra expense incurred in completing the suspended contract for construction work on Huntley project.

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The defendants demurred, alleging unconstitutionality of the reclamation act, but the demurrer was overruled on the ground that the defendants by contracting in pursuance of the reclamation act and participating in the benefits thereof had estopped themselves from denying its constitutionality. On January 18, 1911, judgment was rendered against the defendants in the sum of $4,987.50 and costs. The judgment has been paid.

MONTANA, MILK RIVER PROJECT

On March 11, 1911, complaint in condemnation was filed in the Circuit Court of the United States, Ninth Circuit, in and for the District of Montana, by the United States against Daniel Nicholson and wife for the acquisition of 131.73 acres of land for flowage purposes, Dodson Reservoir, Milk River project, Mont. On March 27, 1911, the court appointed appraisers, and on April 11, 1911, the board reported the value of the tract at the rate of $17.27 per acre. The case is awaiting motion to enter judgment.

October 5, 1905, a complaint was filed in the district court of the State of Montana by the New Harlem Irrigation Co. against the Fort Belknap Canal & Irrigation Co., for the adjudication of water rights on Milk River and its tributaries. Form of contract has been prepared for execution by all parties claiming water rights on Milk River, whereby the water rights of the litigants are limited and described, the remainder of the water in Milk River to belong to the United States for the Milk River project.

During the latter part of June, 1911, one Dave Clark was arrested at Vandalia, Mont., on the charge of larceny, it being charged that he had stolen a set of double harness, the property of the United States, and the defendant has been bound over to await the action of the grand jury.

Complaint in ejectment was filed by the United States on May 17, 1911, against Caroline Henkel et al., to dispossess the defendants of lands relinquished by them to the United States, said lands being within the Blackfeet Indian Reservation. On May 23, 1911, defendants filed demurrer, which was overruled on June 5, 1911. The defendants filed answer to the complaint on June 24, 1911. On June 24, 1911, a petition was filed by defendants praying that the United States be enjoined from prosecuting the said action or from seeking to dispossess plaintiffs, and that certain tracts of the land involved be allotted to the defendants.

MONTANA, SUN RIVER PROJECT

On October 25, 1905, complaint was filed in the district court of the eighth judicial district, Cascade County, Mont., by Kenneth B. McIver against Charles H. Campbell et al., for the purpose of having the water rights on Sun River and its tributaries adjudicated. On May 1, 1911, the court ordered the referee, S. B. Robbins, to make report, and on June 13, 1911, the court decreed water rights to 87,283 acres, with a total of 999.61 second-feet, there being 85 parties to whom 174 water rights were decreed.

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MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT

On July 21, 1910, suit was commenced against Widell-Finley Co. for the recovery of excess cost to the United States in completing the work under a suspended contract of that company for canal construction, and against the Aetna Indemnity Co., surety, for the recovery of $10,000, the penalty under the bond.

On May 31, 1911, the Pacific Coast Construction Co., contractors for the construction of the main dam, Lower Yellowstone project, filed a petition in the Court of Claims seeking to recover $34,852.50 damages for the alleged wrongful act of the United States in declaring default on the contract. The United States has filed a petition in the nature of a set-off and counter claim, and petition against the United States Fidelity & Guaranty Co., surety, praying that the construction company be not permitted to recover under its petition, but that judgment be rendered against the said company in favor of the United States in the sum of $111,310.75, and against the surety in the sum of $40,000.

NEBRASKA-WYOMING, NORTH PLATTE PROJECT

On April 1, 1910, the North Platte Canal & Colonization Co., a corporation, filed a petition in the Court of Claims, claiming $34,441.96 and interest as damages for the alleged failure to deliver sufficient irrigation water during the irrigation seasons of 1906 and 1907, and on the same date the same company filed a petition in the same court claiming $100,000 as damages for the refusal of the Government to acknowledge their intention to and willingness to deliver 500 second-feet of water to a power plant which the company claims it intends to construct. Evidence has been offered by the petitioners in both these cases and petitioners have rested their case. No evidence on behalf of the Government has been offered.

NORTH DAKOTA, BUFORD-TRENTON PROJECT

July 29, 1909, suit was filed in the United States district court of North Dakota by the United States against George C. Thompson to eject him from lots 2 and 3, section 5, T. 152 N., R. 103 W., North Dakota. The case was continued upon representations made that an appeal was pending before the Land Office, and until that was disposed of the court had no jurisdiction. The appeal has been decided, but the case has, on motion of the defendant, been continued.

NEVADA, TRUCKEE-CARSON PROJECT

On February 24, 1909, a complaint was filed by the United States in the circuit court for the northern district of California for the condemnation of certain land owned by the Floriston Pulp & Paper Co. et al. The case has been allowed to remain in statu quo pending negotiations between the defendants and representatives of the Government.

Proceedings in the suit of the United States *v.* Rickey Land & Cattle Co. have been indefinitely suspended.

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OREGON, UMATILLA PROJECT

On May 17, 1909, a petition was filed with the State board of control in the matter of determination of the relative rights to the waters of Umatilla River, and order was issued March 7, 1910. Statement and proof of claim of the United States were filed September, 5, 1910. Conflicting claims were made by several hundred water users. The United States generally contested all claims, and contests were generally made by the other large claimants. Amended contests were filed in June, 1911. Further hearings of contests were postponed until the next fiscal year.

On May 31, 1911, complaint was filed by the city of Stanfield, Oreg., in the Circuit Court of the State of Oregon for Umatilla County against the Umatilla River Water Users' Association and Herbert D. Newell, the plaintiff claiming that the feed canal of the Umatilla project, by reason of seepage, has caused the ground water to rise and flood the streets and fill the cellars. A restraining order issued but was not served until June 10, 1911. On the latter date the parties made a stipulation under which the restaining order may be disregarded.

OREGON-CALIFORNIA, KLAMATH PROJECT

On October 18, 1909, a bill of complaint was filed by the Klamath Lake Navigation Co. in the Circuit Court of the United States for the District of Oregon against the California & Northeastern Railway Co. and Southern Pacific Co., seeking to recover damages for interrupting navigation by the closure of Klamath Strait. The United States intervened because the railway company was acting under contract with the United States, whereby the embankment was to be used as a levee. The case will probably come up for trial soon.

On September 5, 1910, the United States instituted suit in the District Court of the United States for the District of Oregon for the condemnation of lands owned by Fritz R. Hauger et al. The case has been compromised.

SOUTH DAKOTA, BELLE FOURCHE PROJECT

The case of the United States *v.* Widell-Finley Co., pending in the United States court, second division, Mankato, Minn., mentioned in former annual reports, has not been tried. It was set for the April, 1911, term, but continued until the October, 1911, term.

The suit of the United States *v.* William Moses, mentioned in former annual reports, was argued before the United States circuit court of appeals at St. Louis, Mo., in December, 1910. This court affirmed the decision of the district court. (185 Fed. Rep., 90.)

WASHINGTON, YAKIMA PROJECT

The suit begun June 21, 1909, in the United States Circuit Court for the Eastern District of Washington, entitled United States *v.* H. K. Luce, Standard Building Co., and Ira Petty, for the recovery of certain personal property valued at about $10,000, referred to on page 18 of the ninth annual report, is still pending.

A suit entitled United States *v.* H. K. Luce, Standard Building Co., and Empire State Surety Co. was instituted in the United States Dis-

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trict Court for the Western District of Washington in June, 1911. This suit is on contract and bond of defaulting contractor to recover excess cost of construction work completed by the Government at contractor's expense. The amount involved is $9,772.13. The case is pending on Government's complaint.

On January 28, 1911, a suit entitled United States *v.* Theodore Weisberger and the Empire State Surety Co. was brought in the United States Circuit Court for the Eastern District of Washington, for the recovery of excess cost to the Government of completing contract for lining main canal, Tieton unit, after contractor's default. The amount involved is $51,095.05. The case is now pending on Government's demurrer to defendant's answer and cross complaint.

The case of Julius Anthon and wife *v.* United States, filed in November, 1909, in the Circuit Court for the Eastern District of Washington to collect damages of $10,000 for alleged breach of right of way contract and injury to land during construction of Mabton Siphon, Sunnyside unit, referred to on page 19 of the eighth annual report, is still pending.

In May, 1910, a suit entitled United States *v.* State of Washington et al. was brought in the United States Circuit Court for the Eastern District of Washington for the condemnation of certain property needed for construction purposes in connection with Sunnyside unit. This suit is now pending on agreed continuance.

In July, 1910, suit entitled United States *v.* H. E. Nicolai was brought in the United States Circuit Court for the Eastern District of Washington for the purpose of abating a public nuisance, defendant having partially constructed an insecure dam above the Sunnyside Main Canal which endangers its safety and the irrigable lands lying below it. This case is now pending on defendant's answer.

A suit entitled W. A. Bell *v.* J. S. Conway and David O'Hara was filed in the Superior Court of the State of Washington against the project engineer and property officer of the Reclamation Service, the suit being brought by a trustee for the creditors of Theodore Weisberger, defaulting contractor on Government work, to recover by replevin certain machinery and personal property claimed by said creditors under chattel mortgage from defaulting contractor and held by the defendants for the United States by virtue of contract provisions. The case has been transferred to the United States Circuit Court for the Eastern District of Washington and appearance made by the United States attorney.

On June 17, 1911, a suit entitled D. P. Baker *v.* Chas. H. Swigart, E. McCulloh, and R. K. Tiffany was brought in the United States Circuit Court for the Eastern District of Washington, for the purpose of securing an injunction against officers of the Reclamation Service, restraining them from refusing water because of nonpayment of maintenance fees. Temporary injunction was granted on June 30, 1911. The case is now pending on Government's answer to application for permanent injunction.

In December, 1910, a suit entitled United States *v.* Sarah A. Wright et vir was brought in the United States Circuit Court for the Eastern District of Washington, for specific performance of a contract for the purchase of land. Before the case came to trial, deed for the land was given by Mrs. Wright, and the case will now be dismissed.

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WYOMING, SHOSHONE PROJECT

On February 19, 1910, the United States filed a suit in the United States District Court for the District of Montana against Charles Spear for damages to the amount of $188,999.81 on account of default on contract for the construction of the Corbett Tunnel, Shoshone project. On the same date a suit was filed in the same court by the United States against Charles Spear, as principal, and Paul McCormick and Alexander C. Johnson, as sureties on the bond of Charles Spear, for damages in the sum of $75,000, the amount of the bond on the contract for construction of the tunnel. A proposition for settlement of these cases has been submitted by Alexander C. Johnson, one of the sureties, and the Assistant Attorney General is considering the same. In the meantime the suits have been continued by stipulation, the last stipulation having been filed June 29, 1911.

May 19, 1910, complaint was filed in the Circuit Court of the United States for the District of Wyoming by the United States against Charles Spear, Western Construction Co., Paul McCormick, Alexander C. Johnson, H. J. Thompson, and Jeffrey Manufacturing Co., for the purpose of securing the declaration of an equitable lien in favor of the United States upon the Charles Spear Corbett Tunnel plant. On December 12, 1910, argument was had on demurrer filed by the Jeffrey Manufacturing Co., judgment creditor, and H. J. Thompson, vendee under bill of sale. The court overruled the demurrer and granted defendants 30 days in which to file answer to the complaint. The time for filing answer has been extended by stipulation from time to time pending consideration of proposition for settlement submitted by Alexander C. Johnson, said proposition comprehending all cases against Charles Spear and his bondsmen filed by the United States in Montana and Wyoming.

PURCHASES OF RIGHTS AND PROPERTY

Section 7 of the reclamation act provides that where, in carrying out the provisions of the act, it is necessary to acquire any rights or property the Secretary of the Interior may acquire them for the United States by purchase or by condemnation through judicial process.

The following is a complete list of all such completed purchases to June 30, 1911, except as heretofore reported in annual reports:

Purchases of rights and property

ARIZONA, SALT RIVER PROJECT

Vendor	Description	Consideration	Date of deed
Creighton, H. H.	Strip of land in SW. ¼ sec. 35, T. 2 N., R. 3 E., Arizona, containing about 1.20 acres.	$300.00	Mar. 11, 1911
Creighton, W.	Strip of land in S. ½ sec. 35, T. 2 N., R 3 E., Arizona.	1,375.00	Apr. 3, 1911
Glendale Land Co.	3 acres in W. ½ NW. ¼ sec. 27, T. 3 N., R. 2 E., G. and S. R. B. and M., Arizona.	300.00	Oct. 21, 1910
Highland Water Co.	Irrigating canal known as the Highland Canal, situated in Maricopa County, Ariz.	5,000.00	Oct. 31, 1910
Higley, S. W., and wife.	Strip of land in NE. ¼ sec. 34, T. 2 N., R. 3 E., Arizona.	770.00	Oct. 25, 1910
Ingleside Co.	Lots 11 and 12, block 32, and all block 33, of Ingleside.	500.00	Feb. 13, 1911

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Purchases of rights and property—Continued

ARIZONA, SALT RIVER PROJECT—Continued

Vendor	Description	Consideration	Date of deed
Lewis, Chas. M., and wife....	Improvements on strip of land required for canal in W. ½ SW. ¼ NE. ¼ sec. 16, T. 1 N., R. 5 E., G. and S. R. B. and M., Arizona.	$100.00	Mar. 13, 1911
Lewis, Ed. E., and wife.....	Improvements on strip of land required for canal in W. ½ NW. ¼ NE. ¼ sec. 16, T. 1 N., R. 5 E., G. and S. R. B. and M., Arizona.	75.00	Feb. 1, 1911
Mesa Improvement Co.....	Parcels of land in NE. ¼ sec. 34, T. 1 S., R. 5 E., NW. ¼ sec. 21, T. 1 S., R. 5 E., SE. ¼ sec. 32, T. 1 S., R. 5 E., SE. ¼ sec. 4, T. 2 S., R. 5 E., all in G. and S. R. B. and M., Arizona well sites.	294.00	Feb. 21, 1911
Northcutt, John, and wife....	Strip of land in N. ½ SW. ¼ sec. 21, T. 2 N., R. 3 E., Arizona.	350.00	Nov. 1, 1910
Pas, Agnes.....	Improvements on strip of land required for canal in W. ½ NW. ¼ NE. ¼ sec. 16, T. 1 N., R. 5 E., G. and S. R. B. and M., Arizona.	200.00	Jan. 31, 1911
Potter, Ervin W., and wife...	Easement for transmission line across W. ½ SW. ¼ sec. 7, T. 1 N., R. 4 E., G. and S. R. B. and M., Arizona.	150.00	Aug. 11, 1910
Reaksecker, B. F., et al.....	Strip of land in block 16, village of Alhambra..	40.00	Sept. 14, 1910
ARIZONA-CALIFORNIA YUMA PROJECT			
Iaeger, L. J. F., et al.....	Beginning at a post on the E. boundary of the Iaeger claim located S. 0° 39′ E. of the ¼ corner between secs. 27 and 26, T. 16 S., R. 22 E., S. B. M., a distance of 28.69 chains; thence S. 0° 39′ E. 2.95 chains to a post; thence N. 77° 45′ 45″ W., 62.30 chains, to a post; thence N. 0° 29′ W., 2.95 chains, to a post; thence S. 77° 45′ 45″ E., 62.30 chains, to the point of beginning, and containing 17.95 acres.	$1.00	Apr. 4, 1910
CALIFORNIA, ORLAND PROJECT			
Bane, P. D., and wife.....	40-foot strip in NE. ¼ sec. 22, T. 22 N., R. 3 W., M. D. M., 0.6 acre; 30-foot strip in SW. ¼ sec. 23, T. 22 N., R. 3 W., M. D. M., 0.2 acre; 30-foot strip in SE. ¼ NW. ¼ sec. 23, T. 22 N., R. 3 W., M. D. M., 1.8 acres.	$1.00	Feb. 14, 1911
Brown, David.....	30-foot strip in sec. 5, T. 22 N., R. 3 W., M. D. M., 1.6 acres.	1.00	June 24, 1910
Eastby, John M	Part sec. 1, T. 22 N., R. 4. W., M. D. M.....	50.00	Aug. 1, 1910
Ehorn, S. F.....	30-foot strip in SE. ¼ NW. ¼ sec. 23, T. 22 N., R. 3 W., M. D. M., 0.4 acre.	1.00	June 18, 1910
Monroe, A. H., and wife.....	30-foot strip in SE. ¼ NW. ¼ sec. 23, T. 22 N., R. 3 W., M. D. M., 0.9 acre; 40-foot strip in SE. ¼ NW. ¼ sec. 23, T. 22 N., R. 3 W., M. D. M., 0.6 acre.	1.00	Feb. 18, 1911
Moore, Allen T., et al.....	Part of NE. ¼ SW. ¼ sec. 29, T. 23 N., R. 4 W. M. D. M., 0.33 acre.	1.00	Nov. 12, 1910
Morrissey, J. B., and wife.....	40-foot strip in secs. 13 and 14, T. 22 N., R. 3 W., M. D. M., 5.7 acres.	1.00	Aug. 3, 1910
Sheldon, C. C., et al.....	30-foot strip in SE. ¼ sec. 24, T. 22 N., R. 3 W., M. D. M., 1.8 acres.	1.00	Feb. 14, 1911
Sievers, Hans, et al.....	40-foot strip in NE. ¼ sec. 22, T. 22 N., R. 3 W., M. D. M., 1.6 acres; 20-foot strip in NE. ¼ sec. 22, T. 22 N., R. 3 W., M. D. M., 0.4 acre.	1.00	Do.
Wilkins, Marilla I.....	40-foot strip in NE. ¼ sec. 9, T. 22 N., R. 3 W., M. D. M., 5 acres; 30-foot strip in NE. ¼ sec. 9, T. 22 N., R. 3 W., M. D. M., 0.8 acre.	1.00	July 12, 1910

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Purchases of rights and property—Continued

COLORADO, UNCOMPAHGRE VALLEY PROJECT

Vendor	Description	Consideration	Date of deed
Equitable Securities Co.....	Strip of land 100 feet wide across NW. ¼ NE. ¼ and NE. ¼ NW. ¼ sec. 1, T. 49 N., R. 11 W., N. M. P. M., containing 4.18 acres.	$1.00	Mar. 2,1911
Flangan, Oliver P., and wife.	Parcel of land in NE. ¼ SE. ¼ sec. 32, T. 50 N., R. 10 W., N. M. P. M., containing 0.875 acres.	50.00	Apr. 25,1911
Josephsen, Bertha K.....	Part NW. ¼ NW. ¼ sec. 15, T. 23 N., R. 59 E., 2.95 acres.	59.00	Nov. 11,1910
Josephsen, Louis, et al.....	Part S. ½ NE. ¼ and S. ½ NW. ¼ SE. ¼ sec. 15, T. 23 N., R. 59 E., 1.42 acres.	17.75	Jan. 25,1910
	Part SE. ¼ sec. 1, T. 21 N., R. 58 E., M. P. M., 9.5 acres.	95.00	Apr. 20,1909
Norfleet, S. M., and wife.....	Strip of land 50 feet wide across NE. ¼ SE. ¼ sec. 20, T. 50 N., R. 10 W., N. M. P. M., containing 1.24 acres.	1.00	Apr. 3,1911
Pepper, Isaac N., and wife....	Strip of land 100 feet wide across W. ½ SE. ¼ sec. 8, T. 49 N., R. 10 W., N. M. P. M., containing 6.94 acres.	200.00	Mar. 13,1911
Solis, Wm. J., and wife.....	Strip of land 50 feet wide across S. ½ SW. ¼ NE. ¼ sec. 20, T. 50 N., R. 10 W., N. M. P. M., containing 0.964 acre.	1.00	Jan. 6,1911
Van Weaver, Daniel, and wife.	Strip of land 50 feet wide across S. ½ NW. ¼ SE. ¼ sec. 23, T. 49 N., R. 10 W., N. M. P. M., containing 0.29 acre.	1.00	June 7,1911
Westesen, Carl, and wife.....	Strip of land 15 feet wide across NW. ¼ sec. 20, T. 50 N., R. 11 W., N. M. P. M., containing 0.55 acre.	100.00	Apr. 18,1911

IDAHO, BOISE PROJECT

Annett, W. C., and wife.....	Portion of NE. ¼ SE. ¼ sec. 26, T. 3 N., R. 1 E., B. M., 1.69 acres.	$1.00	Oct. 31,1910
Arbaugh, Mrs. Ella.....	Portion of lot 28, Ora Dell second subdivision, in sec. 6, T. 3 N., R. 2 E., 0.067 acre.	1.00	Oct. 10,1910
Ash, Sarah Eliza.....	A portion of SE. ¼ SE. ¼ sec. 36, T. 4 N., R. 1 E., 0.48 acre.	250.00	May 23,1911
Ayres, C. S., and wife.....	Portion of SE. ¼ SE. ¼ sec. 33, T. 4 N., R. 1 W., B. M., 2.1 acres.	315.00	Sept. 10,1910
Barber, Grant.....	A portion of SW. ¼ NW. ¼ sec. 27, T. 3 N., R. 1 E., 2.19 acres.	143.00	Aug. 3,1910
Barber Lumber Co.....	Part lot 1, sec. 28, part NE. ¼ sec. 29; part lots 3 and 4, sec. 33, T. 3 N., R. 3 E., B. M., 94.78 acres.	1,000.00	Aug. 22,1910
Beall, Richard E., and wife...	Portion of S. ½ SE. ¼ sec. 28, and NE. ¼ NE. ¼ sec. 33, T. 3 N., R. 3 E., 0.86 acre.	1.00	Apr. 4,1911
Brown, Frank L., and wife...	Portion of E. ½ SW. ¼ sec. 34, T. 3 N., R. 2 W., 1.455 acres.	1.00	Aug. 3,1910
Brownlee, Alfred A	Relinquishment N. ½ SW. ¼ lots 5 and 6 of sec. 15, T. 3 N., R. 5 E.	.....	Apr. 20,1911
Byers, J. J., and wife.....	Portion of NE. ¼ SE. ¼ of sec. 29, T. 3 N., R. 1 E., 0.34 acre.	34.00	July 23,1910
	Portion of E. ½ NE. ¼ SW. ¼ sec. 29, T. 3 N., R. 1 E., 0.86 acre.	90.00	Do.
	Portion of lot 6 in sec. 6, T. 3 N., R. 2 E., and easement to enlarge lateral, 0.315 acre.	300.00	Mar. 3,1911
Cahalan, T. D.....	Easement of portion of Holy Terror placer mine in sec. 32, T. 3 N., R. 4 E.	1.00	Apr. 4,1911
Close, L. E., and wife.....	A portion of NW. ¼ SW. ¼ sec. 26, T. 3 N., R. 1 E., 1.79 acres.	200.00	Sept. 7,1910
Davidson, Wm. J., and wife..	Portion of N. ½ NW. ¼ NW. ¼ sec. 11, T. 3 N., R. 1 W., 1.4 acres.	275.00	Aug. 2,1911
Deck, Geo. R., and wife.....	Portion of E. ½ E. ½ NE. ¼ sec. 14, T. 3 N., R. 1 W., B. M., 0.8 acre.	100.00	Oct. 18,1910
Finley, C. W.....	Part of N. ½ NW. ¼ NW. ¼ sec. 36, T. 3 N., R. 2 W., 0.08 acre, easement.	1.00	May 12,1911
Floete, Franklin.....	Portion of N. ½ SE. ¼ sec. 35, T. 3 N., R. 1 E., 1.95 acres.	1.00	Mar. 7,1911
Folsom, Ferdinand, and wife.	A portion of N. ½ N. ½ SE. ¼ SE. ¼ sec. 28, T. 3 N., R. 1 E., 1.11 acres.	166.50	Sept. 8,1910
Frazier, Alida.....	A portion of E. ½ SE. ¼ SW. ¼ sec. 6, T. 3 N., R. 2 E., 0.061 acre.	100.00	Feb. 10,1911
Gibbens Ernest E., and wife.	Portion of SE. ¼ sec. 17, T. 3 N., R. 3 W., 3.1 acres.	1.00	Apr. 3,1911
Gilbert, Ernest D.....	Portion of NE. ¼ sec. 2, T. 3 N., R. 5 W., 0.9 acre.	1.00	Sept. 27,1910
Giudici, Frank.....	A portion of N. ½ S. ½ SE. ¼ sec. 26 T. 3 N., R. 1 E., 2.11 acres.	211.00	Sept. 9,1910

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Purchases of rights and property—Continued

IDAHO, BOISE PROJECT—Continued.

Vendor	Description	Consideration	Date of deed
Glorieux, A. J	A portion of lots 1 and 2, sec. 33, T. 3 N., R. 3 E., and portion of lot 1, sec. 4, T. 2 N., R. 3 E., 11.9 acres.	$400.00	July 27, 1910
Grimm, Homer H	Portion of lot 33. Ash Park subdivision, in NE. ¼ sec. 1, T. 3 N., R. 1 E., B. M., easement for pipe line.	1.00	Nov. 5, 1910
Herrick, Emily, and husband.	Portion of NW. ¼ SW. ¼ sec. 6, T. 3 N., R. 2 E., 0.54 acre.	275.00	May 23, 1911
Highland Live Stock & Land Co. (Ltd.).	Right of way, for transmission line, E. ½ SE. ¼ and SE. ¼ NE. ¼ sec. 25, T. 3 N., R. 3 E.	1.00	June 26, 1911
Kent, Joseph, and wife	W. ½ NW. ¼ and lot 9 of sec. 11, T. 3 N., R. 5 E., reservoir site, 108.8 acres.	6,000.00	May 18, 1911
Kent, Joseph, and wife and Richard Kent.	SE. ¼ SW. ¼ and lots 5 and 6, sec. 2, and E. ½ of NW. ¼ and lots 2, 3, 7, and 8, sec. 11, all in T. 3 N., R. 5 E., 287.7 acres.	25,500.00	Do.
Do	NW. ¼ NW. ¼ sec. 12, lot 7, sec. 2; lots 1 and 4, sec. 11; lot 11, sec. 1, T. 3 N., R. 5 E., 153.4 acres.	6,000.00	Do.
Koester, John W., and wife	Portion of SW. ¼ NE. ¼ and NW. ¼ SE. ¼ sec. 29, T. 3 N., R. 1 W., 1.62 acres.	1.00	July 13, 1910
	Portion SW. ¼ NE. ¼, NW. ¼ SE. ¼ sec. 29, T. 3 N., R. 1 W., 1 acre (borrow pit privilege).	100.00	Jan. 17, 1911
Laughlin, E. C., and E. E. Vallier and wives.	A portion of SW. ¼ NE. ¼ sec. 28, T. 3 N., R. 1 E., 0.68 acre.	68.00	Aug. 31, 1910
	A portion of E. ½ SW. ¼ SE. ¼ sec. 28, T. 3 N., R. 1 E., 1.65 acres.	165.00	Sept. 7, 1910
	A portion of SE. ¼ NW. ¼ SE. ¼ sec. 28, T. 3 N., R. 1 E., 0.96 acre.	144.00	Do.
Link, Mary	All lots 1, 2, and 4, sec. 15; lots 5 and 6, sec. 10, T. 3 N., R. 5 E., B. M., reservoir site, 140.1 acres.	2,000.00	Mar. 3, 1911
McBirney, Mary H., and husband.	Portion of SW. ¼ NW. ¼ sec. 26, T. 3 N., R. 1 E., 1.68 acres.	126.00	Apr. 11, 1911
Martin, Frank, and wife	Easement for pipe line on and over lots 8, 25, 26, 27, 28, 31, 32, Ash Park subdivision, in NE. ¼ of sec. 1, T. 3 N., R. 1 E.	1.00	Nov. 5, 1910
Do	A portion of lot 8, Ash Park subdivision, in NE. ¼ sec. 1, T. 3 N., R. 1 E., 0.02 acre.	100.00	June 7, 1911
Matli, Chas	License for wagon road. NW. ¼ NW. ¼ sec. 28 T. 3 N., R. 3 E.	1.00	Apr. 28, 1911
Mellinger, M. M., and wife and Clarence Mellinger.	Portion of SE. ¼ NE. ¼ sec. 29, T. 3 N., R. 1 E., 1.82 acres.	182.00	July 25, 1910
Moriondo, D., and wife	A portion of NW. ¼ SE. ¼ sec. 29, T. 3 N., R. 1 E., 2.33 acres.	250.00	Mar. 19, 1910
Nelson, James C., and wife	Portion of SW. ¼ SW. ¼ sec. 5, T. 3 N., R. 1 W., 0.29 acre.	29.00	Apr. 10, 1911
Niday, J. L	Part of S. ½ NW. ¼ NW. ¼ sec. 36, T. 3 N., R. 2 W., 0.08 acre, easement.	1.00	Apr. 29, 1911
Perkins, Dean, and J. M. Harbert.	Portion of NW. ¼ SW. ¼ sec. 6, T. 3 N., R. 2 E., 0.007 acre.	1.00	Sept. 4, 1910
Pleasants, Wm. A., and wife	Reservoir site—all of N. ½ SE. ¼ SE. ¼ and NE. ¼ SE. ¼ sec. 26, T. 3 N., R. 3 W., 60 acres.	7,500.00	Oct. 22, 1910
Pride, Marcella S. and husband.	A portion of S. ½ NE. ¼ SE. ¼ of sec. 36, T. 4 N., R. 1 E.	150.00	Mar. 4, 1911
Scully, Mrs. Margaret	Portion of NE. ¼ SW. ¼ sec. 6, T. 3 N., R. 2 E., 0.03 acre.	1.00	Sept. 22, 1910
Shafer, J. A., and wife	A portion of SE. ¼ SW. ¼ sec. 26, T. 3 N., R. 1 E., 0.87 acre.	100.00	Aug. 24, 1910
Shook, S. W., and wife	Portion of W. ½ E. ½ NE. ¼ sec. 14, T. 3 N., R. 1 W., 0.8 acre.	100.00	Sept. 6, 1910
Spaulding, A. W. and M. E.	A portion of N. ½ NE. ¼ SE. ¼ sec. 36, T. 4 N., R. 1 E.	150.00	Apr. 5, 1911
Truax, I. Lee, and wife	A portion of S. ½ N. ½ SE. ¼ SE. ¼ sec. 28, T. 3 N., R. 1 E., 0.73 acre.	109.50	Sept. 3, 1910
Waters, James A. and Truman.	Right of way over mining claims Ellen and Salt and Pepper, being a portion of sec. 32, T. 3 N., R. 4 E., B. M.	1.00	Apr. 3, 1911
Whitehead, H. L., et al	Portion of N. ½ lot 26, Ora Dell, second subdivision, in SE. ¼ SW. ¼ sec. 6, T. 3 N., R. 2 E., 0.0014 acre.	1.00	Oct. 3, 1910
Wilton, Thomas, and wife	A portion of NE ¼ SE. ¼ sec. 26, T. 3 N., R. 2 E., 1.6 acres.	300.00	Jan. 12, 1911
Wood, Clara L	Portion of NE. ¼ SW. ¼ sec. 6, T. 3 N., R. 2 E., 0.162 acre.	1.00	Oct. 7, 1910
Wright, George W	Portion of lots 3 and 4 of sec. 3, T. 2 N., R. 3 E., B. M., for transmission line.	1.00	June 16, 1911

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Purchases of rights and property—Continued

IDAHO, MINIDOKA PROJECT

Vendor	Description	Consideration	Date of deed
Albert, E. H., and wife	Parts of lots 2 and 5 and of SE. ¼ sec. 19, T. 9 S., R. 29 E. and of S. ½ SE. ¼ sec. 24, T. 9 S., R. 28 E., B. M.	$3,250.00	Oct. 18, 1910
Anderson, O. P. and wife	Parts of NW. ¼ SW. ¼ sec. 29, and of N. ½ NE. ¼ sec. 31, T. 10 S., R. 25 E., B. M., 6.1 acres.	272.00	Oct. 6, 1910
Craner, Geo., and wife and Haight, Hector C. and wife.	Parts of lots 1 and 2 and of E. ½ NE. ¼ sec. 19, T. 11 S., R. 23 E., 3.1 acres.	1.00	Oct. 3, 1910
Milligan, Andrew R., and wife.	Improvements on SW. ¼ SE. ¼ and S. ½ SW. ¼ sec. 33, T. 47 N., R. 115 W., and NW. ¼ NW. ¼ sec. 4, T. 46 N., R. 115 W., Uinta County, Wyoming.	3,000.00	Aug. 6, 1910
Starrh, Thos. A., and wife	Parts of lot 2 and W. ½ SE. ¼ sec. 20, T. 10 S., R. 22 E., B. M., 2 acres.	100.00	Sept. 6, 1910
State of Idaho	Part sec. 16, T. 10 S., R. 23 E	30.00	Oct. 1, 1910

MONTANA, FLATHEAD PROJECT

Allard, Chas	Improvements on sec. 22, T. 22 N., R. 20 W	$134.18	June 25, 1910
Allard, Joseph	Improvements on sec. 6, T. 19 N., R. 19 W	7.75	June 14, 1911
Allard, Sophie R	Improvements on sec. 17, T. 21 N., R. 19 W	59.00	June 22, 1911
Bisson, Camille	Improvements on sec. 20, T. 22 N., R. 19 W	191.02	June 19, 1911
Bisson, Mary E	Improvements on sec. 20, T. 22 N., R. 19 W	9.50	Do.
Buckhouse, Geo. W	Improvements on sec. 17, T. 19 N., R. 19 W	19.63	June 14, 1911
Chalwain, Martin	Improvements on sec. 28, T. 18 N., R. 19 W	800.24	May 30, 1910
Deschamps, Edward	Improvements on sec. 17, T. 19 N., R. 19 W	10.27	June 30, 1911
Dubay, Mary	Improvements on sec. 19, T. 22 N., R. 19 W	12.00	June 19, 1911
Ducharme, Josette	Improvements on sec. 19, T. 18 N., R. 19 W	.38	June 27, 1911
Finley, Alex	Improvements on sec. 30, T. 20 N., R. 19 W	188.25	May 30, 1910
Finley, Antoine	do	29.16	Do.
Finley, Baptiste	Improvements on sec. 23, T. 22 N., R. 20 W	508.22	May 26, 1910
Finley, Joseph	Improvements on sec. 30, T. 20 N., R. 19 W	43.92	May 30, 1910
	Improvements on sec. 31, T. 20 N., R. 19 W	46.85	June 19, 1911
	Improvements on sec. 6, T. 19 N., R. 19 W	14.68	June 30, 1911
Finley, Rosalie	Improvements on secs. 31 and 32, T. 20 N. R. 19 W.	21.68	June 19, 1911
Howlett, Mary D	Improvements on sec. 18, T. 20 N., R. 20 W	89.52	May 30, 1910
Kickinghorse, Chas	Improvements on sec. 30, T. 20 N., R. 19 W	339.42	Do.
La Rose, Antoine	Improvements on sec. 6, T. 19 N., R. 19 W	20.41	June 19, 1911
Lucier, Pierre	Improvements on secs. 16 and 21, T. 22 N., R. 20 W.	65.00	May 26, 1910
Luddington, Elsie T	Improvements on sec. 12, T. 20 N., R. 21 W	163.31	May 30, 1910
Marago, Louis	Improvements on sec. 21, T. 22 N., R. 20 W	403.70	May 26, 1910
Matt, Frank	Improvements on sec. 34, T. 22 N., R. 20 W	376.42	Do.
Morais, Antoine	Improvements on secs. 14 and 15, T. 22 N., R. 20 W.	1,884.79	Do.
Morais, Noel	Improvements on sec. 27, T. 22 N., R. 20 W	596.53	Do.
Murray, Benj. F	do	1,155.50	Do.
Pariseau, Antoine	Improvements on sec. 22, T. 22 N., R. 20 W	474.74	Do.
Raymond, Henry	Improvements on sec. 20, T. 21 N., R. 19 W	116.67	June 16, 1911
Redhorn, Tenas	The SW. ¼ SW. ¼ NE. ¼ of sec. 16, T. 20 N., R. 20 W., 10 acres.	250.00	Dec. 10, 1910
Trout, Josephine	Improvements on sec. 19, T. 18 N., R. 19 W	12.10	June 16, 1911

MONTANA, HUNTLEY PROJECT

Bearbelow, James, et al	1.70 acres in Indian allotment No. 357, being in sec. 7, T. 2 N., R. 28 E.	$28.90	Oct. 16, 1908

MONTANA, MILK RIVER PROJECT

Sturvant, John	Part of sec. 17, T. 30 N., R. 30 E., M. P. M., 1.65 acres.	$500.00	Dec. 27, 1910

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Purchases of rights and property—Continued

MONTANA, SUN RIVER PROJECT

Vendor	Description	Consideration	Date of deed
Clark, Thomas, and wife and George Milne and wife.	Release of United States from all claims for damages to lots 1, 2, 3, and NW. ¼ SW. ¼, sec. 14, N. ½ NE. ¼, SE. ¼ NE. ¼, and NE. ¼ SE. ¼ of sec. 15, T. 20 N., R. 3 W.	$2,000.00	Dec. 16,1909
Ish, William and wife	Water rights on Sun River and tributaries; also one-ninth interest in Wiegand Ditch and one-fifth interest in Bull and Fox ditch.	(1)	Oct. 15,1910
Ward, Flora, and husband	Water rights on Sun River and tributaries; also six-ninths interest in Wiegand Ditch and four-tenths interest in Bull and Fox ditch.	(2)	Do.

MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT

Adams, Burton S	Part of sec. 13, T. 22 N., R. 58 E., M. P. M., 31.03 acres.	$309.80	Nov. 27,1909
Anderson, Annie	Part of sec. 27, T. 23 N., R. 59 E., M. P. M., 1.43 acres.	14.30	July 3,1908
Blake, B. Q	Part of sec. 32, T. 23 N., R. 59 E., M. P. M., 5.06 acres.	101.20	July 5,1910
Hill, Mary Helen	Part of sec. 15, T. 23 N., R. 59 E., M. P. M., 2.95 acres.	73.75	Aug. 26,1910
Josephensen, Louis	Part of sec. 15, T. 23 N., R. 59 E., M. P. M., 2.04 acres.	25.50	June 1,1910
Kemmis, T. A., jr	Part of sec. 7, T. 22 N., R. 59 E., M. P. M., 33.5 acres.	182.00	Aug. 11,1908
Kiichli, Elizabeth	Part of sec. 28, T. 20 N., R. 58 E., M. P. M., 0.57 acre.	5.70	Nov. 23,1909
Lovering, Elsie	Part of sec. 15, T. 23 N., R. 59 E., M. P. M., 2.95 acres.	59.00	Nov. 14,1906 Nov. 11,1910
Lovering, Owen	Part of sec. 31, T. 23 N., R. 59 E., 1.85 acres	18.50	Mar. 17,1910
Nelson, Nels Henry	Part of sec. 35, T. 19 N., R. 57 E., 0.27 acre	60.00	Mar. 16,1910
Northey, R. E	Part of sec. 15, T. 23 N., R. 59 E., 1.42 acres	17.75	Jan. 25,1910
Northey, Winifred L	Part of sec. 15, T. 23 N., R. 59 E., M. P. M., 0.76 acre.	1.00	Do.
Northwestern Improvement Co.	Part of sec. 33, T. 20 N., R. 58 E., M. P. M., 1.67 acres.	1.00	Aug. 10,1910
State of Montana	Part of sec. 16, T. 18 N., R. 57 E., M. P. M., 11.46 acres; part of sec. 16, T. 20 N., R. 58 E., M. P. M., 13.11 acres; part of sec. 36, T. 24 N., R. 59 E., M. P. M., 5.20 acres.	1.00	July 15,1910
	Part of sec. 16, T. 23 N., R. 59 E., M. P. M., 26.07 acres.	1.00	Dec. 29,1910
	Part of sec. 36 T. 24 N., R. 59 E., M. P. M., 16.9 acres.	1.00	June 20,1911
Stewart, John A	Part of sec. 15, T. 21 N., R. 58 E., M. P. M., 19.08 acres.	190.80	Mar. 4,1910
Williston Land Co	Part of sec. 1, T. 21 N., R. 58 E., M. P. M., 9.5 acres.	95.00	Apr. 20,1909

NEBRASKA-WYOMING, NORTH PLATTE PROJECT

Frederic, Minnie, and husband.	Release of damage from overflow to lot 5, sec. 10, lots 6, 8, and 9, sec. 9, and lot 7, sec 4, T. 26 N., R. 65 W., 6th P. M.	$420.00	Apr. 27,1911
Wyoming, State of	Right of way (extra width) through sec. 16, T. 24 N., R. 60 W.; sec. 36, T. 25 N., R. 61 W., B. H. M., 174.8 acres.	(3)	July 8,1910

NEVADA, TRUCKEE-CARSON PROJECT

Ferguson, Callie B	Right of way or easement for "L" line canal, "B_1b," "B_1," "B_1b'," and "B_1c" laterals, and "B_1c" drain over lands in the NW. ¼ of sec. 1, T. 18 N., R. 28 E., M. D. M.	$1.00	May 1,1911

[1] Perpetual water right for 11.3 acres.
[2] Perpetual water right for 71 acres.
Donated under legislative act, Wyoming laws.

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Purchases of rights and property—Continued

NEW MEXICO-TEXAS, RIO GRANDE PROJECT

Vendor	Description	Consideration	Date of deed
Abila, Juan de Jesus	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.26 acre.	$30.00	May 1,1911
Apodaca, Asencion	Lot in village of Cantadero, in Pedro Armendaris grant No. 33, 0.25 acre.	10.00	June 6,1911
Baca, Daniel, and wife	10.34 acres in Pedro Armendaris grant No. 33..	300.00	May 22,1911
Baca, Donaciano	Part sec. 12 T. 9 S., R. 3 W	173.90	Mar. 29,1911
Baca, Francisco, and wife	26.70 acres in Pedro Armendaris grant No. 33..	273.50	May 17,1911
Baca, Lorenzo	23.05 acres in Pedro Armendaris grant No. 33..	650.00	May 25,1911
Baca, Manuel, and wife	9.42 acres in Pedro Armendaris grant No. 33...	330.00	May 26,1911
Baca, Nicolas, and wife	17.29 acres in Pedro Armendaris grant No. 33..	333.25	May 29,1911
Barreras, Clofio	15.60 acres in Pedro Armendaris grant No. 33..	436.00	June 1,1911
Birner, Frederico, and wife	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.52 acre.	110.00	May 27,1911
	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.26 acre.	50.00	Apr. 10,1911
Birner, George, and wife	36.81 acres in and near the village of Paraje, in Pedro Armendaris grant No. 33.	555.00	May 3,1911
Birner, Juan	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.20 acre.	160.00	Apr. 8,1911
Carabajal, Cruz, and wife	15.39 acres in Pedro Armendaris grant No. 33..	186.95	Mar. 29,1911
Carabajal, Pablo, and wife	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.12 acre.	65.00	Do.
	20.34 acres farming land in Pedro Armendaris grant No. 33.	300.00	Do.
Carmody, James, and wife	15.36 acres near village of Cantadero, in Pedro Armendaris grant No. 33.	181.80	May 24,1911
Chavez, Carpio, and wife	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.25 acre.	90.00	June 15,1911
Chavez, Cristobal	20.45 acres in Pedro Armendaris grant No. 33...	102.25	May 22,1911
	11.95 acres in Pedro Armendaris grant No. 33..	247.75	Do.
Chavez, Isaias	14.46 acres near Cantadero, in Pedro Armendaris grant No. 33.	300.00	May 31,1911
Chavez y Garcia, Juan	7.98 acres near Cantadero, in Pedro Armendaris grant No. 33.	250.00	May 29,1911
Chavez, Simon, and wife	81.63 acres in and near village of Paraje, in Pedro Armendaris grant No. 33.	1,402.65	Mar. 30,1911
Gabaldon, Elfego, and wife	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 1.01 acres.	160.00	June 12,1911
Gonzales, Adolfo, and wife	68.57 acres in and near the village of Paraje, in Pedro Armendaris grant No. 33.	1,311.20	May 6,1911
Gonzales, Gregorio	NW. ¼ NW ¼ sec. 13, and E. ½ NE. ¼ sec. 14, T. 9 S., R. 3 W., N. M. P. M., 120 acres.	[1] 2,590.00	June 14,1911
Gonzales, Guadalupe, and wife	51.48 acres in and near the village of Paraje, in Pedro Armendaris grant No. 33.	500.00	May 17,1911
Gonzales, Tomas, and wife	23.54 acres in and near the village of Cantadero, in Pedro Armendaris grant No. 33.	350.00	May 24,1911
Gutierres, Jose Rafael, and wife.	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.42 acre.	140.00	Apr. 4,1911
	28.22 acres of agricultural land near village of Paraje in Pedro Armendaris grant No. 33.	312.20	Do.
Jaramillo, Vicente, and wife	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.52 acre.	130.00	Do.
Mendoza, Rafael, and wife	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 0.77 acre.	205.00	May 1,1911
	8.90 acres of agricultural land near village of Paraje, in Pedro Armendaris grant No. 33.	840.00	Do.
Mora, Hijinia Gallegos	65.57 acres in and near village of Paraje, in Pedro Armendaris grant No. 33.	400.00	Sept. 30,1910
Mora, Matias, and wife	69.78 acres in and near village of Paraje, in Pedro Armendaris grant No. 33.	950.00	Apr. 4,1911
Nieto, Juan, and wife	House and lot in Cantadero, in Pedro Armendaris grant No. 33, 0.24 acre.	90.00	May 22,1911
Padilla, Manuel, and wife	94.74 acres in and near village of Paraje, in Pedro Armendaris grant No. 33.	858.20	Apr. 29,1911
Padilla, Miguel, and wife	20.30 acres in and near village of Cantadero, in Pedro Armendaris grant No. 33.	585.00	June 9,1911
Padilla, Sabas	2.10 acres in and near village of Paraje, in Pedro Armendaris grant No. 33.	145.00	Mar. 29,1911
Ramirez, Jesus	1.90 acres in village of Paraje, in Pedro Armendaris grant No. 33, containing two houses, etc.	130.00	Apr. 7,1911
Rodrigues, Vicente, and wife	29.38 acres near Cantadero, in Pedro Armendaris grant No. 33.	456.00	May 19,1911
Serna Casimira Sineros de	75.40 acres near village of Paraje, in Pedro Armendaris grant No. 33.	400.00	May 1,1911
Serna, Dolores, and wife	12.97 acres near village of Paraje, in Pedro Armendaris grant No. 33.	415.00	May 3,1911
	House and lot in village of Paraje, in Pedro Armendaris grant No. 33, 4.05 acres.	250.00	Do.

[1] Judgment.

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Purchases of rights and property—Continued

NEW MEXICO-TEXAS, RIO GRANDE PROJECT—Continued

Vendor	Description	Considera-tion	Date of deed
Silva, Jose	9.12 acres near village of Cantadero, in Pedro Armendaris grant No. 33.	$91.20	June 3, 1911
Torres, Epitacia	15.08 acres near Cantadero, in Pedro Armendaris grant No. 33.	276.20	May 19, 1911
Torres, Hippolito, and wife	13 acres near village of Cantadero, in Pedro Armendaris grant No. 33.	315.00	Do.
Torrez, Alfredo, and wife	13.25 acres near Cantadero, in Pedro Armendaris grant No. 33.	325.00	May 25, 1911
Trujillo y Lopez, Pablo, and wife.	13.54 acres near village of Cantadero in Pedro Armendaris grant No. 33.	479.20	May 22, 1911
Ve'arde, Jesus and wife	House and lot in village of Cantadero, in Pedro Armendaris grant No. 33, 0.39 acre.	100.00	June 3, 1911
OREGON, UMATILLA PROJECT			
Coburn, Anna A., and husband.	Part lot 4, block 1, Gulliford's addition to the city of Echo, Oreg.	$57.50	Jan. 31, 1910
Gulliford, Clarence J., and wife.	Part E. ½ SE. ¼ sec. 16, T. 3 N., R. 29 E., W. M.	250.00	Dec. 5, 1907
Harrison, Franklin R., and wife.	Part lot 6, block 3, Gulliford's addition to the city of Echo, Oreg.	22.00	Feb. 28, 1910
Johnson, Roscoe R	Part lots 3 and 4, block 3, Gulliford's addition to the city of Echo, Oreg.	100.00	Feb. 23, 1910
McCullough, Benjamin F., and wife.	Part NW. ¼ SE. ¼ sec. 8, T. 3 N., R. 29 E., W. M.	96.20	July 14, 1908
Morris, Margaret I., and husband.	Improvements on W. ½ sec. 2, T. 4 N., R. 29 E., W. M.	1,084.70	Oct. 21, 1910
Northern Pacific Ry. Co	Parts sec. 23, T. 4 N., R. 28 E., W. M., secs. 27, 31, and 3, T. 4 N., R. 29 E., W. M., and sec. 35, T. 5 N., R. 29 E., W. M.	1,082.10	Apr. 13, 1910
Rees, Evelyn C., and husband	Improvements on E. ½ SW. ¼ sec. 3, T. 4 N., R. 29 E., W. M.	280.17	Oct. 11, 1910
Starkweather, Theresa M	Improvements on SE. ¼ sec. 3 T. 4 N., R. 29 E., W. M.	560.35	Do.
Thorton, Walter	Part lot 7, block 3, Gulliford's addition to the city of Echo, Oreg.	75.00	Jan. 31, 1910
Travis, Martha A	Part lots 2 and 3, block 1, Gulliford's addition to the city of Echo, Oreg.	40.00	Do.
OREGON-CALIFORNIA, KLAMATH PROJECT			
Ager, Chas., unmarried	Part NW. ¼ NE. ¼ sec. 34, T. 39 S., R. 9 E., W. M.	$279.00	Apr. 15, 1911
Altamont Investment Co	Part S. ½ SW. ¼ sec. 3, S. ½ SW. ¼, W. ½ NE. ¼, N. ½ NW. ¼ sec. 10; N. ½ NW. ¼, and NW. ¼ NW. ¼ NE. ¼ sec. 15, T. 39 S., R. 9 E., W. M.	1.00	Sept. 5, 1910
	Part NW. ¼ sec. 3, T. 40 S., R 9 E., W. M	1.00	Do.
Anderson, Dempster, and wife.	Part SW. ¼ SE. ¼ sec. 15, and lot 1, sec. 22, T. 39 S., R. 10 E., W. M.	200.00	Mar. 29, 1911
Beddig, Chas., unmarried	Part NW. ¼ NW. ¼ sec. 29, T. 39 S., R. 9 E., W. M.	1.00	Jan. 14, 1911
Bloomingcamp, Edward, unmarried.	Part lot 1, sec. 30, and part lot 1, sec. 31, T. 39 S., R. 10 E , W. M.	293.40	June 19, 1911
Bloomingcamp, Geo., unmarried.	QCD to above lot 1, sec. 31, and lot 1, sec. 31, T. 39 S., R. 10 E., W. M.	1.00	Do.
Brown, Adah, and husband	Part lot 3, sec. 21, T. 39 S., R. 10 E.; W. M	1,320.00	Feb. 23, 1911
Campbell, W. R., and wife, and A. R. Campbell and wife.	Part lot 1, sec. 21, T 39 S., R. 10 E., W. M	1,244.00	June 24, 1911
Clements, Geo. D., and wife	Part NE. ¼ sec. 35, T. 39 S., R. 9 E., W. M	722.50	Nov. 29, 1910
Clements, James H	QCD sec. 35, T. 39 S., R. 9 E., W. M	1.00	Dec. 3, 1910
Corpening, Frank, and wife	Part lot 1, sec. 15, and lot 6, sec. 14, T 39 S., R. 10 E., W. M.	850.00	Mar. 16, 1911
DeLap, C. R., and wife	Part SE. ¼ NE. ¼ sec. 21, and lot 4, sec. 21, T. 39 S., R. 10 E., W M.	1,500.00	Mar. 14, 1911
Greene, Wm., unmarried	Part SW. ¼ sec. 36, T. 39 S., R. 9 E., W. M	231.00	Jan. 14, 1911
Griffith, T. E	Part NE. ¼ of sec. 36, T. 39 S., R. 9 E., W. M	1,000.00	Jan. 7, 1911
Grigsby, B. S., and wife	Part SW. ¼ NW ¼ sec. 22, T. 39 S., R. 10 E., W. M.	900.00	Mar. 13, 1911
Henley, Sophia A., widow	Part NE. ¼ and SE. ¼ of sec. 25, T. 39 S., R. 9 E., W. M.; SE. ¼ sec. 18, NW. ¼ and N. ½ SE. ¼ sec. 20; N. ½ SW. ¼ and N. ½ NW. ¼ of sec. 20, T. 40 S., R. 10 E., W. M.	1.00	July 19, 1910

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Purchases of rights and property—Continued

OREGON-CALIFORNIA, KLAMATH PROJECT—Continued

Vendor	Description	Consideration	Date of deed
Holland, Joseph H., and wife, and Roderick McKenzie and wife.	Part lot 2, sec. 21, T. 39 S., R. 10 E., W. M.....	$1.00	Apr. 6, 1911
Kilgore, Silas W., Silas W. Kilgore, jr., Merle S. Kilgore and wife.	Part lots 1, 2, 3, and 4, sec. 29, T. 39 S., R. 10 E., W. M.	3,300.00	Mar. 23, 1911
Kinney, A., and wife.....	Part lot 3, sec. 22, T. 39 S., R. 10 E., W. M.....	425.75	Oct. 3, 1910
Klamath County Bank.....	Part NW. ¼ of sec. 36, T. 39 S., R. 9 E., W. M....	1.00	Nov. 29, 1910
Klamath Development Co....	Part NE. ¼ NE. ¼ sec. 20, T. 39 S., R. 9 E., W. M.	186.00	
Krizo, Joe, and wife.....	Part lot 1, sec. 10, T. 41 S., R. 11 E., W. M.....	1.00	Dec. 2, 1910
McKenzie, Sidney K., and wife.	Part lot 2, sec. 21, T. 39 S., R. 10 E., W. M.....	937.35	June 28, 1911
Newton, Almo H., and wife...	Part NW. ¼ sec. 36, T. 39 S., R. 9 E., W. M.....	800.00	Nov. 26, 1910
Orr, M. F.....	Part lots 1 and 2, sec. 20, T. 39 S., R. 10 E., W. M.	891.75	Mar. 16, 1911
Phillips, Sarah A., and husband.	Part lots 2 and 3 and NW. ¼ NW. ¼ of sec. 31, T. 39 S., R. 10 E., W. M.	1,863.20	Dec. 22, 1910
Poindexter, C. A.....	Part SE. ¼ NE. ¼ and NE. ¼ SE. ¼ sec. 28, T. 39 S., R. 9 E., W. M.	472.50	Apr. 29, 1911
Rogers, H. A., and wife.....	Part SW. ¼ SE. ¼ sec. 29, T. 38 S., R. 9 E., W. M., part lot 3, Block 58, Nichols addition to Klamath Falls, Oreg.	75.00	Aug. 14, 1910
Wilcox, F. E., and wife.....	Part lot 8, sec. 21, NW. ¼ NW. ¼ sec. 28, lot 3, sec. 20, and part of sec. 29, T. 39 S., R. 10 E., W. M.	4,280.40	June 5, 1911
Williams, Cassie Baker, and husband.	Part lots 6 and 7, sec. 21, T. 39 S., R. 10 E., W. M.	253.00	Jan. 25, 1911
Worden, Chas. E., and wife...	Part lot 11, sec. 21, T. 39 S., R. 9 E., W. M.; also part SE. ¼ NE. ¼ and lot 6, sec. 20, T. 39 S., R. 9 E., W. M.	200.00	Nov. 15, 1910
	Part NW. ¼ SW. ¼, SW. ¼ SE. ¼, and SE. ¼ SW. ¼ sec. 27, T. 39 S., R. 9 E., W. M.	585.00	Apr. 28, 1911

SOUTH DAKOTA, BELLE FOURCHE PROJECT

Burke, C. P.....	Part of SW. ¼ NE. ¼ sec. 12, T. 8 N., R. 3 E., B. H. M.	$1.00	Feb. 27, 1911
Hamilton, Willis G.....	Part of SE. ¼ NW. ¼ and the SW. ¼ NE. ¼ sec. 35, T. 9 N., R. 4 E., B. H. M.	138.50	May 19, 1910
May, Louis and Agatha.....	Part of SE. ¼ NE. ¼ sec. 7, T. 8 N., R. 4 E., B. H. M.	1.00	Mar. 21, 1911

UTAH, STRAWBERRY VALLEY PROJECT

Gardner, Jos. S., and Ruth Sabin.	Right of way for High Line canal across the SW. ¼ NW. ¼ sec. 13, T. 9 S., R. 2 E., Salt Lake Base and Meridian.	$95.00	Feb. 3, 1910
Hatch, Sarah E., and L. A....	Right of way for High Line canal across the SW. ¼ NW. ¼ sec. 13, T. 9 S., R. 2 E., Salt Lake Base and Meridian.	40.00	Sept. 15, 1910
Lemmon, Hyrum, and Mary E.	Right of way for High Line canal across the SE. ¼ SE. ¼ of sec 15, T. 9 S., R. 2 E., Salt Lake Base and Meridian.	164.00	Oct. 12, 1909
Plumb, Merlin J., and Ruth..	Right of way for High Line canal across the SW. ¼ SW ¼ of sec. 14, T. 9 S., R. 2 E., Salt Lake Base and Meridian.	267.00	Sept. 14, 1909
Snell, F. M., and Annie E ...	Right of way for High Line Canal across lot No. 1, sec. 5, in T. 9 S., R. 3 E., Salt Lake Base and Meridian.	35.00	Dec. 5, 1910

WASHINGTON, OKANOGAN PROJECT

Brown, Walter.....	Right of way for feed canal over and across lots O and P of block 26 of F. M. Baum's first addition to the town of Conconully, county of Okanogan, Wash.	$1.00	Feb. 25, 1910
Conconully Lake Rererveir Company.	All of blocks 31, 51, 93, 49, 50, 86, 87, 88, 89, 90, 91, 92, and lots J, K, L, M, and N of block 48 of F. M. Baum's first addition to the town of Conconully, aforesaid county and State, and water rights, etc.	1.00	Aug. 6, 1910

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Purchases of rights and property—Continued

WASHINGTON, OKANOGAN PROJECT—Continued

Vendor	Description	Consideration	Date of deed
Dodge, T. C., et ux, and Cloud, W. W., et ux.	Right of way for feed canal over and across lots L and K of block 26 of F. M. Baum's first addition to the town of Conconully, aforesaid county and State.	$1.00	Feb. 25, 1910
Dorwin, W. J., et ux.....	Right of way for feed canal over and across lots J, K, L, M, and N of block 34 of F. M. Baum's first addition to the town of Conconully, aforesaid county and State.	1.00	Apr. 7, 1910
Herrman, Charles, et ux, and Bown, E. J., et ux.	Right of way for feed canal over and across lots 15, 16, 17, and 26 of block 1 of McDonald's addition to the town of Conconully, aforesaid county and State.	1.00	Mar. 2, 1910
Moore, Geo. W., et ux.....	Lots 8 and 9, block "W," Conconully Mining Company's first addition to the town of Conconully, aforesaid county and State.	70.00	Oct. 24, 1910
Richardson, H. C.....	All of blocks 31, 51, 93, 49, 50, 86, 87, 88, 89, 90, 91, 92, and lots J, K, L, M, and N of block 48 all in F. M. Baum's first addition to the town of Conconully, Okanogan County, Wash., also all right, title, and interest in and to that certain outlet ditch and right of way therefor constructed and maintained over and across lot 2 of block Q and lots 4, 5, 6, 10, 11, 12, and 13 of block R of the Conconully Mining Co.'s first addition to the said town of Conconully.	1.00	Apr. 30, 1910

WASHINGTON, YAKIMA PROJECT

Cleveland, Ernest Clyde, and wife.	Improvements on strip in W. ½ W. ½ NW. ¼, sec. 15, T. 13 N., R. 18 E., W. M.	$25.00	Oct. 1, 1910
Coffin Bros.....	Strip across SE. ¼ NW. ¼, sec. 36, T. 9 N., R. 22 E., W. M.	1.00	Jan. 17, 1911
Crook, W. H., and wife.....	Damage to ½ acre in NE. ¼ SE. ¼, sec. 16, T. 11 N., R. 20 E., W. M.	100.00	Dec. 7, 1910
Dickey, S. A., and wife.....	25-foot strip across lots 1 and 2, sec. 27, T. 12 N., R. 19 E., W. M.	522.00	July 23, 1910
Dickson, A. C., and wife.....	Improvements on strip in NE. ¼ NW. ¼, sec. 8, T. 11 N., R. 20 E., W. M.	200.00	Dec. 16, 1909
Dow, Allen B., and wife, Toll, T. H.	Improvements on strip in SW. ¼ NW. ¼, sec. 15, T. 13 N., R. 18 E., W. M.	125.00	Aug. 27, 1910
Druse, C. E., and wife, Druse, A. Z.	Irregular tract in NE. ¼ SE ¼, sec. 14, T. 14 N., R. 16 E., W. M.	200.00	Mar. 14, 1911
Dunn, Annie M.....	25-foot strip across N. ½ NW. ¼, sec. 6, T. 11 N., R. 20 E., W. M.	700.00	Sept. 2, 1910
Dyas, Elizabeth, and husband.	25-foot strip across SW. ¼ NW. ¼, sec. 35, T. 12 N. R. 19 E., W. M.	100.00	Aug. 11, 1910
Fear, Thos., and wife.....	Strip in sec. 31, T. 14 N., R. 17 E., W. M	3,600.00	Aug. 16, 1910
Field, Geo. W., and wife.....	Triangular strip in sec. 27, T. 14 N., R. 17 E., W. M.	1.00	May 12, 1911
Follansbee, Oscar S., and wife.	Improvements on strip in NW. ¼ NE. ¼. SW. ¼, sec. 23, T. 11 N., R. 20 E., W. M.	100.00	Feb. 24, 1911
Hardy, John, and wife.....	25-foot strip over NW ¼ SW. ¼, sec. 23, T. 11 N., R. 20 E., W. M.	300.00	Oct. 29, 1910
Hilbery, L. J., and wife.....	Improvements on land in SW. ¼, sec. 24, T. 11 N., R. 20 E., W. M.	500.00	June 14, 1910
Johnson, U. C., and wife.....	Strip across NW. ¼ SW. ¼ and N. ½ N. ½ SW. ¼ SW. ¼, sec. 24, T. 11 N., R. 20 E., W. M.	100.00	Do.
Jones, F. C., and wife.....	Easement for pipe line across NE. ¼ SW. ¼, sec. 36, T. 10 N., R. 22 E., W. M.	412.50	Mar. 15, 1911
Lawrence, L. E., and wife....	Right of way across SW. ¼ SE. ¼, sec. 24, T. 11 N., R. 20 E., W. M.	35.00	June 14, 1910
McCormick, Robt., and wife..	Easement for deposit of metal on S. ½ NE. ¼ SW. ¼ and SE. ¼ NW. ¼ SW. ¼, sec. 23, T. 11 N., R. 20 E., W. M.	100.00	June 1, 1910
McCurdy, J. F., and wife.....	20-foot strip across SW. ¼ NE. ¼ and NW ¼ SE. ¼, sec. 8, T. 11 N., R. 20 E., W. M.	625.00	Oct. 31, 1910
Mahan, Marion, and wife.....	25-foot strip across SW. ¼ SE. ¼, sec. 27, T. 12 N., R. 19 E., W. M.	245.00	July 25, 1910
Mellis, Wm., and wife.....	25-foot strip across SW. ¼ SE. ¼, sec. 27, T. 12 N., R. 19 E., W. M.	300.00	Do.
Oleson Fruit Co.....	Right of way in secs. 9 and 16, T. 11 N., R. 20 E., W. M.	1,000.00	Sept. 28, 1910
Oleson, P. K.....	Strip across SE. ¼ SE. ¼, sec. 19, T. 10 N., R. 23 E. W. M.	150.00	Dec. 17, 1909
Powell, W. L.....	Right of way across SE. ¼ NE. ¼, sec. 2, T. 8 N., R. 22 E., W. M.	1.00	Jan. 17, 1911

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Purchases of rights and property—Continued

WASHINGTON, YAKIMA PROJECT—Continued

Vendor	Description	Consideration	Date of deed
Sterns, C. J., and wife	30-foot strip in NE. ¼ NE. ¼ NE. ¼, sec. 11, T. 8 N., R. 24 E., W. M.	$1.00	Jan. 24, 1911
Steward, Arthur G., and wife	Improvements on 135-foot strip across S. ½ SE. ¼ and NE. ¼ SE. ¼, sec. 30, T. 10 N., R. 23 E., W. M.	625.00	Jan. 5, 1910
Todd, G. A., and wife	Lot 13 of Riverdale tracts in sec. 1, T. 8 N., R. 23 E., W. M.	200.00	Nov. 12, 1908
Walden, Freeman, and wife	Improvements on strip 20 feet wide in NW. ¼ SE. ¼ NE. ¼, sec. 22, T. 11 N., R. 20 E., W. M.	35.00	Nov. 5, 1909
Williams, J. S., and wife	50-foot strip across NE. ¼ NE. ¼, sec 34, T. 12 N., R. 19 E., W. M.	2,750.00	July 19, 1910
Wood, F. B., and wife	Strip in N. ½ NW. ¼ NE. ¼, sec. 22, T. 11 N., R. 20 E., W. M.	200.00	Mar. 14, 1911
Wright, Sarah A., and husband.	W. ½ NE. ¼ SW. ¼, sec. 2, T. 20 N., R. 14 E., W. M.	450.00	Jan. 9, 1911

WYOMING, SHOSHONE PROJECT

Andren, Claus	NW. ¼ SW. ¼, sec. 20, T. 52 N., R. 102 W	$1,967.79	Jan. 21, 1911
Cody, William F	E. ½ SE. ¼, sec. 20, T. 52 N., R. 102 W	3,900.00	Nov. 23, 1911
Jensen, Jens P	13.6 acres in sec. 25, T. 52 N., R. 103 W	360.69	Apr. 10, 1911
Nordquist, Nels	10.4 acres in SE. ¼ SW. ¼ and all of SW. ¼ SE. ¼, sec. 20, T. 52 N., R. 102 W.	2,698.90	Mar. 7, 1911
Wyoming, Big Horn County	6.39 acres in sec. 14, T. 52 N., R. 104 W.; 6.35 acres in sec. 15, T. 52 N., R. 104 W.; 8.04 acres in sec. 16, T. 52 N., R. 104 W.; 2.75 acres in sec. 17, T. 52 N., R. 104 W.; 0.32 acre in sec. 19, T. 52 N., R. 104 W.	(1)	Jan. 21, 1910

[1] No money consideration.

TRANSPORTATION AND PURCHASES

A number of agreements, involving substantial reduction in freight rates, have been secured during the fiscal year in addition to those listed in the ninth annual report. General freight contracts have been entered into with the following transportation companies:

Chicago, Milwaukee & Puget Sound Railway Co
Houston East & West Texas Railway Co.
Houston & Shreveport Railroad Co.
Houston & Texas Central Railroad Co.
Iowa Central Railway Co.
Minneapolis & St. Louis Railroad Co.
St. Joseph & Grand Island Railway Co.
Spokane, Portland & Seattle Railway Co.
Toledo, St. Louis & Western Railroad Co.

Special concessions in freight rates from important shipping points to particular points of delivery on one or more projects have been granted by the following companies:

Atchison, Topeka & Santa Fe Railway Co.
Chicago & Northwestern Railway Co.
Denver & Rio Grande Railroad Co.
Oregon-Washington Railroad & Navigation Co.
Southern Pacific Co.

On July 1, 1910, the unsettled bills for freight and express charges amounted to $48,680.94. There were received during the fiscal year for administrative examination bills amounting to $439,791.80, and

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bills amounting to $422,979.29 were examined, and bases for settlement thereof were arranged with the claimants, leaving outstanding June 30, 1911, unsettled bills amounting to $65,493.45. Claims made by the transportation companies on the freight bills settled during the fiscal year amounted to $422,979.29, and the amount found due thereon, after examination at the transportation office, was $405,360.55. The commercial charges on these bills would have been $666,876.59.

On June 30, 1911, the records of the transportation office showed the status of expense bills covering shipments consigned to contractors to be as follows:

Expense bills on hand July 1, 1910	$257.14
Expense bills received during the fiscal year	22,527.72
Expense bills on which claims were filed with the transportation companies during the fiscal year	15,232.98
Freight claims against transportation companies made on the above expense bills	7,730.93
Expense bills not subject to concessions on hand and received during the fiscal year	7,203.61
Expense bills on hand June 30, 1911	348.27

A total of 1,607 purchases of supplies for field use, amounting in cost to $574,323.74, were made through the Chicago office during the fiscal year.

CEMENT

PURCHASE AND MANUFACTURE

During the fiscal year ending June 30, 1910, about 86,000 barrels of cement were purchased by the Reclamation Service and 3,600 barrels were manufactured at the cement mill at Roosevelt, Ariz. On August 1, 1910, a sufficient amount of cement had been manufactured to complete the Roosevelt Dam and the mill was closed with a total output of 338,452 barrels.

The following table contains data relating to the contracts for cement in operation or completed during the fiscal year ending June 30, 1911:

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Contracts for cement

No.	Date	Contractor	Estimated number of barrels	Estimated value	Estimated earnings June 30, 1911	Completion due
71	Oct. 25, 1905	Pacific Portland Cement Co.	40,000	$62,000.00	$65,080.55	.....
224	Mar. 16, 1908	Universal Portland Cement Co.	10,000	9,500.00	[1] 10,996.30	Oct. 1, 1908
230	Apr. 1, 1908	Portland Cement Co.	12,000	11,760.00	[1] 15,004.26	Do.
231	Apr. 2, 1908	Western Building Material Co.	7,500	8,250.00	10,189.10	Do.
258	Oct. 1, 1908	Iola Portland Cement Co.	40,000	25,600.00	[1] 31,147.60	June 1, 1909
271	Feb. 12, 1909	Pacific Portland Cement Co.	25,000	38,750.00	[1] 54,455.17	Dec. 31, 1909
273	Feb. 25, 1909	Iola Portland Cement Co.	63,000	50,400.00	[1] 61,069.14	.....
274	Feb. 27, 1909	Universal Portland Cement Co.	3,000	2,850.00	[1] 3,119.75	.....
282	Mar. 2, 1909	Colorado Portland Cement Co.	26,600	27,404.00	[1] 30,893.90	Dec. 1, 1909
312	Feb. 7, 1910	Atlas Portland Cement Co.	14,000	11,200.00	9,696.00	Dec. 31, 1910
313	.....do.....	Marquette Cement Manufacturing Co.	6,000	5,100.00	[1] 5,763.36	Do.
317	Feb. 8, 1910	Colorado Portland Cement Co.	15,000	17,250.00	20,520.00	Mar. 10, 1911
318	Mar. 3, 1910	Atlas Portland Cement Co.	7,000	5,600.00	4,456.00	Dec. 31, 1910
320	Feb. 25, 1910	Ash Grove Lime and Portland Cement Co.	17,000	16,150.00	17,719.00	June 30, 1911
327	May 17, 1910	Cowell Portland Cement Co.	1,000	1,550.00	.....	May 17, 1911
329	May 21, 1910	Pacific Portland Cement Co.	6,000	9,300.00	7,783.33	June 30, 1911
331	June 4, 1910	Union Portland Cement Co.	9,000	12,600.00	[1] 17,576.50	Dec. 31, 1910
356	Feb. 28, 1911	Pacific Portland Cement Co.	6,000	9,300.00	4,650.00	Dec. 31, 1911
368	Apr. 27, 1911	Iola Portland Cement Co.	12,000	9,600.00	4,216.00	Mar. 31, 1912
370	May 10, 1911	Portland Cement Co. of Utah	12,000	18,000.00	3,631.18	Do.
371	Apr. 29, 1911	Three Forks Portland Cement Co.	8,000	9,440.00	666.41	Do.
372	May 1, 1911	United Kansas Portland Cement Co.	12,000	9,600.00	.....	Do.
377	May 13, 1911	Pacific Portland Cement Co.	9,000	11,880.00	.....	Do.
378	May 24, 1911	Riverside Portland Cement Co.	4,000	5,600.00	.....	Do.
380	May 23, 1911	Southwestern Portland Cement Co.	10,000	13,700.00	.....	Do.
389	May 18, 1911	Union Portland Cement Co.	16,500	21,450.00	.....	Do.
393	May 20, 1911	Henry Cowell Lime and Cement Co.	15,000	18,600.00	.....	Do.

[1] Completed.

TESTING

The amount of cement for which tests were made during the fiscal year ending June 30, 1911, was 93,986 barrels, of which 88,986 barrels were accepted and 5,000 barrels were rejected.

The specifications under which cement is purchased by the Reclamation Service and the methods of testing employed in the laboratory conform in general to the standard specifications for cement and the methods of testing recommended by the American Society for Testing Materials.

Regular sets of long-time tests have been continued and special investigations have been carried on as follows: Sand tests for various projects, including tests on materials from the sites of the proposed Engle and Arrow Rock Dams on the Rio Grande and Boise projects, together with an extensive series of sand-cement tests (both tensile and compressive) for the latter structure; tests of cement under low temperature conditions; tests and analyses in connection with the matter of alkali investigation, including a large number of experimental test pieces placed in the field at various points where alkali conditions prevail; and collection of samples from and inspection of new plants which have recently commenced operations in the territory from which the service draws its cement supplies. The accompanying tabulation gives the average results of all tests on accepted cement made at the main laboratory at Denver, Colo., and at the laboratory at Berkeley, Cal., from January 1, 1904, to June 30, 1911.

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Tabulation of cement tests from Jan. 1, 1904, to June 30, 1911

[Averages of accepted cement]

Brands	Quantity	Fineness		Setting time		Specific gravity	Composition of briquettes	Tensile strength															
								1 day		7 days		28 days		3 months		6 months		1 year		2 years		3 years		5 years	
		Passing No. 100 sieve	Passing No. 200 sieve	Initial	Final			Number of briquettes	Pounds per square inch	Number of briquettes	Pounds per square inch	Number of briquettes	Pounds per square inch	Number of briquettes	Pounds per square inch	Number of briquettes	Pounds per square inch	Number of briquettes	Pounds per square inch	Number of briquettes	Pounds per square inch	Number of briquettes	Pounds per square inch	Number of briquettes	Pounds per square inch
	Bbls.	*Per ct.*	*Per ct.*	*Hrs. m.*	*Hrs. m.*																				
Ash Grove	18,850	95.2	82.5	3 30	6 46	3.17	Neat	20	344	390	755	390	779	15	762	15	751	5	686	5	732	....	....	....	....
							3 to 1	....	....	390	346	390	440	15	489	15	473	5	422	5	408	....	....	....	....
Atlas	17,690	96.2	78.2	1 45	5 02	3.17	Neat	30	353	385	603	385	667	30	705	25	694	15	666	5	721	5	587	....	....
							3 to 1	....	....	385	235	385	358	30	467	25	435	15	429	5	384	5	382	....	....
Cowboy	15,645	96.1	77.1	3 11	6 15	3.16	Neat	30	294	575	756	575	876	30	845	25	890	25	816	25	780	25	736	5	766
							3 to 1	....	....	575	279	575	393	30	445	25	456	25	435	25	426	25	409	5	407
El Toro	200	93.8	78.6	4 30	7 00	3.18	Neat	35	368	35	653	35	767	30	774	25	781	5	828	....	....	....	....	....	....
							3 to 1	....	....	35	303	35	397	30	463	25	474	5	426	....	....	....	....	....	....
Golden Gate	180,438	95.5	76.8	3 16	5 41	3.12	Neat	35	308	6,911	644	5,545	784	135	764	40	707	20	700	10	697	....	....	....	....
							3 to 1	....	....	6,911	212	5,545	340	135	454	40	428	20	398	10	389	....	....	....	....
Ideal	121,962	95.2	77.8	3 16	6 58	3.13	Neat	85	387	2,444	677	2,444	734	90	735	85	738	80	713	65	726	50	708	30	667
							3 to 1	....	....	2,444	277	2,444	369	90	441	85	444	80	458	65	436	50	404	30	428
Iola	116,177	93.6	78.6	3 36	7 08	3.16	Neat	105	364	2,212	787	2,212	850	115	848	110	796	100	783	75	790	55	765	15	665
							3 to 1	....	....	2,212	310	2,212	427	115	451	110	448	100	422	75	413	55	391	15	417
Marquette	32,155	94.7	77.3	3 18	7 05	3.15	Neat	35	384	635	724	635	822	35	755	35	737	30	723	25	736	15	696	....	....
							3 to 1	....	....	635	296	635	402	35	441	35	447	30	442	25	443	15	437	....	....
Mount Diablo	7,125	94.6	80.7	3 24	6 02	3.13	Neat	5	334	110	642	110	705	5	718	5	691	5	636	5	638	....	....	....	....
							3 to 1	....	....	110	266	110	359	5	337	5	350	5	341	5	329	....	....	....	....

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Red Devil	14,795	96.5	79.9	3	55	6	30	3.15	Neat	30	373	440	682	440	730	35	765	35	777	25	798	10	728	5	648	....	....
									3 to 1	.....	.....	440	334	440	425	35	458	35	467	25	422	10	312	5	408	....	....
Red Diamond	19,711	96.1	74.8	3	57	8	22	3.15	Neat	35	329	1,195	649	1,195	717	45	738	45	761	40	790	40	793	40	724	40	701
									3 to 1	.....	.....	1,195	302	1,195	406	45	477	45	498	40	509	40	472	40	421	40	404
Standard (Napa)	8,996	97.8	87.6	4	00	6	41	2.97	Neat	10	295	280	598	300	703	20	672	10	616	10	630	....	.....	.....	.....	.....	....
									3 to 1	.....	.....	280	263	300	378	20	468	10	526	10	509	....	.....	.....	.....	.....	....
Sunflower	85,330	94.3	78.2	3	32	7	23	3.16	Neat	65	366	1,145	814	1,145	901	65	842	60	837	60	782	60	765	35	763	10	695
									3 to 1	.....	.....	1,145	283	1,145	428	65	446	60	445	60	405	60	388	35	390	10	336
Trident	1,515	96.1	82.4	5	15	8	30	3.14	Neat	10	382	65	660	65	668	5	674	5	676	....	.....	.....	.....	.....	.....	.....	.....	....
									3 to 1	.....	.....	65	341	65	423	5	437	5	422	....	.....	.....	.....	.....	.....	.....	.....	....
Universal	184,100	96.9	81.0	3	24	7	26	3.14	Neat	70	343	3,635	659	3,635	803	70	860	70	817	70	799	65	785	60	748	20	738
									3 to 1	.....	.....	3,635	263	3,635	375	70	420	70	407	70	402	65	373	60	344	20	351
Utah	2,621	96.5	79.5	3	09	6	03	3.16	Neat	5	262	114	571	114	630	5	636	5	698	....	.....	.....	.....	.....	.....	.....	.....	....
									3 to 1	.....	.....	114	299	114	386	5	446	5	431	....	.....	.....	.....	.....	.....	.....	.....	....
Yankton	28,484	96.3	80.4	3	53	8	28	3.21	Neat	85	261	945	644	945	775	60	791	60	785	60	773	45	742	30	758	5	608
									3 to 1	.....	.....	945	252	945	357	60	433	60	440	60	430	45	415	30	422	5	426
Total and average.	855,794	95.5	78.7	3	24	6	52	3.14	Neat	690	343	21,516	682	20,170	783	790	785	655	774	550	762	435	761	320	737	125	693
									3 to 1	.....	.....	21,516	260	20,170	373	790	448	655	447	550	432	435	411	320	379	125	398

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SECONDARY PROJECTS

In addition to the primary irrigation projects which have been approved by the Secretary of the Interior for detailed investigation or for construction and which are discussed in this report under the head of "Discussion of projects," pages 64 to 250, a number of secondary projects have been investigated at various times since the organization of the Reclamation Service. The work on the secondary projects has in general been limited to the gathering of information as to water supply and the determination of the character and extent of irrigable lands. In Table 11, on page 41, will be found a list of the secondary projects, together with statements of voucher transactions and net investments of the United States thereon to June 30, 1911.

INDIAN IRRIGATION

Under an agreement made in 1907 between the Office of Indian Affairs and the Reclamation Service certain irrigation work on Indian reservations authorized by Congress and provided for in appropriations under the control of the Indian Office is being performed by the Reclamation Service. Plans and estimates for proposed work are prepared by engineers of the Reclamation Service and transmitted to the Office of Indian Affairs for review. If the plans and estimates are concurred in by the Office of Indian Affairs and are afterwards approved and authorized by the Secretary of the Interior, the work is prosecuted by the Reclamation Service in accordance therewith, and the cost is returned to the reclamation fund from the authorized Indian appropriations, upon statements rendered monthly. Important work of the Reclamation Service on Indian irrigation projects is described on pages 119 to 130, and the financial status of the work as a whole is shown by Table 20, on page 47.

FINANCES

RECLAMATION FUND

The act of June 17, 1902 (32 Stat., 388), provides that all moneys received from July 1, 1900, from the sale and disposal of public lands in certain States and Territories, and including the surplus fees and commissions in excess of allowances to registers and receivers of the land office, and excepting the 5 per cent of the proceeds of the sales of public lands set aside by law for educational and other purposes, shall be reserved, set aside, and appropriated as a special fund to be known as the "reclamation fund."

Table 1 shows the accretions to the reclamation fund, by States, for the period covered by the fiscal years 1901 to 1910, inclusive, probable additions for the fiscal year 1911, and the estimated totals for the entire period covered by the fiscal years 1901 to 1911, inclusive. The amount estimated for the year 1911 is based upon the actual receipts from the sales of public lands as reported by receivers of the several land offices and the average percentage accruing to the reclamation fund, as shown by Table 2. The grand total, $71,590,572.67, represents the entire amount that will probably have become available for expenditure prior to December 31, 1912, exclusive of loans authorized by act of June 25, 1910. (36 Stat., 835.) This table also

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shows the gross amount of the allotments to cover work to December 31, 1911, and the actual net investment of the United States to June 30, 1911, by States.

TABLE 1.—*Receipts from the sales of public lands, allotments, and net investment, by States*

States	Actual receipts to June 30, 1910	During fiscal year 1911		To June 30, 1911	
		Estimated	Total estimated	Allotments	Net investment
Arizona	$704,933.34	$141,157.18	$846,090.52	$14,569,752.25	$12,817,988.00
California	4,194,440.30	341,324.21	4,535,764.51	2,397,667.39	1,752,020.69
Colorado	5,144,933.12	594,947.36	5,739,880.48	7,484,352.95	4,597,734.29
Idaho	4,145,576.30	301,804.71	4,581,844.79	11,322,396.92	8,276,138.55
Idaho, sales of town lots	118,674.78	15,789.00			
Kansas	754,665.77	91,669.57	846,335.34	419,000.00	380,030.09
Montana	5,601,813.61	969,117.53	6,591,987.93	6,330,163.40	4,634,826.90
Montana, sales of town lots	18,669.35	2,387.44			
Nebraska	1,215,391.07	178,318.00	1,393,709.07	5,347,377.01	3,594,553.04
Nevada	335,586.63	79,935.89	415,522.52	5,918,503.63	4,115,850.34
New Mexico	2,938,126.39	425,945.52	3,364,071.91	4,080,543.12	1,145,384.74
North Dakota	10,463,635.17	698,224.90	11,161,860.07	1,989,124.85	1,779,832.18
Oklahoma	5,520,804.87	104,368.62	5,625,173.49	72,215.12	69,088.29
Oregon	9,412,067.39	309,705.77	9,721,773.16	4,178,990.27	2,689,655.30
South Dakota	4,484,266.43	1,075,059.47	5,600,028.90	3,150,000.00	2,683,345.04
South Dakota, sales of town lots		40,703.00			
Texas				1,964,000.00	116,298.70
Utah	1,367,381.22	111,100.02	1,478,481.24	3,459,877.02	1,267,288.92
Washington	5,848,303.13	240,905.78	6,089,208.91	7,324,607.63	5,527,655.95
Wyoming	3,238,878.01	342,186.82	3,598,839.83	6,427,417.38	5,128,456.38
Wyoming, sales of town lots	17,300.00	475.00			
Secondary projects				79,011.06	
Town sites				23,000.00	12,997.05
General accounts				392,790.00	351,689.63
Total	65,525,446.88	6,065,125.79	71,590,572.67	86,930,790.00	60,940,834.08

Because of the size of the work and consequent desirability of making plans far in advance it has been found necessary to make forecasts of the amount that will become available before the actual figures can be known. Table 2 shows by fiscal years the gross receipts from the sales of public lands excepting town-site lots, the amounts accruing to the reclamation fund, and the percentages of the totals represented by the amounts added to the reclamation fund.

TABLE 2.—*Total receipts from the sale of public lands and resulting additions to the reclamation fund*

Fiscal year	Total receipts from reclamation States (not including town-site sales)	Additions to reclamation fund	
		Amount (not including town-site receipts)	Per cent of total receipts
1901	$3,618,546.38	$3,144,821.91	86.908
1902	5,115,619.61	4,585,520.53	89.637
1903	9,395,741.68	8,713,996.60	92.744
1904	7,605,978.29	6,826,253.59	89.748
1905	5,328,084.07	4,805,515.39	90.192
1906	5,732,554.35	5,166,336.50	90.122
1907	8,471,757.75	7,914,131.71	93.417
1908	10,235,294.28	9,430,573.98	92.137
1909	8,391,938.83	7,755,466.81	92.415
1910	7,679,421.61	7,028,185.73	91.521
Total	71,574,936.85	65,370,802.75	91.332

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ALLOTMENTS

From time to time, as funds have become available and as the preliminary investigations of the several projects have shown their feasibility and practicability, the construction of such projects has been authorized and allotments therefor have been made with a view to providing the funds necessary to carry on the work. As the annual additions to the fund have usually become available about January 1 of each year, the annual allotments have been based upon the calendar year rather than upon the fiscal year. In making these allotments it has been found advisable to outline a general fiscal program. The engineers of the service are asked to submit their plans of work and estimates of the funds necessary to carry them out. A conference is then called for consideration of these plans and estimates, and finally a program is formulated and submitted to the Secretary of the Interior. Three such conferences have thus far been held, namely, at Fallon, Nev., July 24 to 31, 1907; Mitchell, Nebr., July 27 to 31, 1908; and at Portland, Oreg., and Seattle, Wash., July 30 to August 5, 1909.

Table 3 shows the approved allotments for projects, town-site operations, and general office administration.

TABLE 3.—*Allotments for primary and secondary projects, town-site development, and general expenses to June 30, 1911*

	Per cent chargeable	Project	1902–1910 (see ninth annual report)	Additional, 1911		Total
				Reclamation fund	Bond loan	
Arizona		Salt River	$9,170,000		$495,000	$9,665,000
Arizona-California	83,17	Colorado River	45,000			45,000
Do	83,17	Yuma	4,120,000	$500,000	1,200,000	5,820,000
California		Orland	608,000			608,000
Colorado		Grand Valley	225,000		1,000,000	1,225,000
Do		Uncompahgre	4,455,000	300,000	1,500,000	6,255,000
Idaho		Boise	4,267,000	500,000	2,000,000	6,767,000
Do		Minidoka	3,977,000	559,000		4,536,000
Kansas		Garden City	419,000			419,000
Montana		Huntley	955,000	110,000		1,065,000
Do		Milk River	941,000	300,000	1,000,000	2,241,000
Do		Sun River	722,000	150,000		872,000
Montana-North Dakota	70,30	Lower Yellowstone	2,945,000	50,000		2,995,000
Nebraska-Wyoming	70,30	North Platte	5,135,000	500,000	2,000,000	7,635,000
Nevada		Truckee-Carson	4,213,000	500,000	1,193,000	5,906,000
New Mexico		Carlsbad	707,000	18,000		725,000
Do		Hondo	359,000			359,000
New Mexico-Texas	60,40	Rio Grande	310,000	100,000	4,500,000	4,910,000
North Dakota		Missouri River pumping	983,000	50,000		1,033,000
Oklahoma		Cimarron	12,000			12,000
Oregon		Central Oregon	45,000			45,000
Do		Umatilla	1,325,000	200,000	325,000	1,850,000
Oregon-California	75,25	Klamath	2,334,000		600,000	2,934,000
South Dakota		Belle Fourche	2,670,000	480,000		3,150,000
Utah		Strawberry Valley	1,135,000		2,272,000	3,407,000
Washington		Okanogan	603,000	13,000		616,000
Do		Yakima	4,711,000		1,915,000	6,626,000
Wyoming		Shoshone	3,828,000	300,000		4,128,000
		Secondary projects	666,000			666,000
		Town-site development	23,000			23,000
		General accounts	300,000	92,790		392,790
Total			62,208,000	4,722,790	20,000,000	86,930,790

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CASH TRANSACTIONS AND BALANCES

In most governmental accounting the practice has been to limit the bookkeeping entries to completed cash transactions, and following that plan the general cash account was at first used in this service as the controlling statement for all other accounts and statements. Statements of this kind appeared in the fifth and sixth annual reports; but the cash transactions alone do not show the financial condition of the Reclamation Service. The accounts of the Reclamation Service are so kept as to show other assets and liabilities. The cash account, however, must, if correct, agree with the Treasury Department's statements of funds made available by appropriation and repayment of expenditures or withdrawals. Table 4 shows a condensed statement of cash appropriated, collected, disbursed, and on hand; Table 5, a reconciliation of the amounts of the appropriations, withdrawals, and balances with those shown by statements of the Treasury Department; and Table 6 shows balances in subtreasuries and United States depositories to the credit of special fiscal officers to June 30, 1911.

TABLE 4.—*Reclamation fund account (32 Stat., 388) to June 30, 1911*

Item		Debit	Credit
Balance end of fiscal year 1910, as per Ninth Annual Report, page 35, Table 4			$58,487,146.79
Receipts during fiscal year 1911:			
Appropriation warrant—			
No. 4, July 18, 1910	$1,786,111.43		
No. 11, Sept. 30, 1910	10,114.36		
No. 17, Dec. 31, 1910	5,242,074.30		
No. 18, Dec. 31, 1910	47,355.36		
No. 29, Mar. 31, 1911	4,885.33		
No. 43, June 30, 1911	7,113.75		7,097,654.53
Total			65,584,801.32
Disbursements, 204,962 vouchers, as per Table 7		$66,305,918.77	
Collections, 15,105 vouchers, as per Table 8			5,365,084.69
Balance with Treasurer of the United States, as per Table 16		3,713,132.50	
Balance with special fiscal agents, as per Table 6		930,834.74	
Total		70,949,886.01	70,949,886.01

TABLE 5.—*Balances of reclamation fund with the Treasurer of the United States to June 30, 1911*

Item	Appropriations	Withdrawals	Balances
Totals and balance end of fiscal year 1910, as per Ninth Annual Report, page 36, Table 5 [1]	$58,487,146.79	$54,456,946.09	$4,030,200.70
Fiscal year 1911	7,097,804.53	7,314,299.96	3,813,705.27
Totals and balance as per statements of Treasury Department	65,584,951.32	61,771,246.05	3,813,705.27
To reconcile with accounts of the Reclamation Service: For items in above not in Reclamation Service accounts, deduct for transfer settlement Treasurer United States, improperly carried as miscellaneous receipts, failing to reduce withdrawals, and appropriated by Warrant No. 37, May 5, 1911, unduly increasing appropriation	150.00	150.00	
	65,584,801.32	61,771,096.05	3,813,705.27

[1] The appropriations, withdrawals, and balances for the fiscal year 1910 shown in this table are taken from the Treasury Department's "Statement of balances, appropriations, and disbursements of the Government for fiscal year 1910," p. 65.

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TABLE 5.—*Balances of reclamation fund with the Treasurer of the United States to June 30, 1911*—Continued

Item			Appropriations	Withdrawals	Balances
For items in Reclamation Service accounts, but not included in above, add withdrawals on direct settlements by the auditor		$12,272.25			
Add withdrawals on requisition		108,000.00			
		120,272.25			
Deduct repayments on deposits	$19,142.14				
Deduct repayments on direct settlements	557.34				
		19,699.48			
Net withdrawals		100,572.77		$100,572.77	$100,572.77
Totals and balance as per Reclamation Service accounts			$65,584,801.32	61,871,668.82	3,713,132.50

TABLE 6.—*Balances with special fiscal agents on June 30, 1911*

Name	Located at—	Amount
Arthur, Wm. S	Williston, N. Dak	$13,724.82
Barnhard, C. B	Phoenix, Ariz	41,322.54
Brown, Geo. W	Fort Shaw, Mont	20,302.58
Brown, Jay	Elephant Butte, N. Mex	7,418.09
Bruen, H. W	Seville, Mont	30,710.27
Buck, John J	Sunnyside, Wash	17,208.19
Caden, Harry	Klamath Falls, Oreg	5,937.44
Cavis, F. L	Boise, Idaho	2,073.41
Clawson, Ray R	do	35,896.41
Cundiff, Frank S	Yuma, Ariz	1,242.91
Dolphin, Jas. A	Denver, Colo	11,044.83
Duganne, Chas. G	Washington, D. C	13,418.64
Eddington, H. E	Phoenix, Ariz	18,238.77
Frisbee, C. E	Seville, Mont	15,186.61
Furstenfeld, E. R	Montrose, Colo	36,588.04
Gawler, Jos. C	North Yakima, Wash	34,533.85
Gullickson, A. H	do	23,195.85
Hamilton, C. E	Easton, Wash	32,905.63
Hause, T. W	Powell, Wyo	27,059.00
Hedden, S. E	Boise, Idaho	100,000.00
Hogue, C. C	Klamath Falls, Oreg	26,735.35
Hough, Frank G	Fallon, Nev	10,236.97
Israel, F. J	Glendive, Mont	19,606.06
Jensen, N. K	Rupert, Idaho	39,734.16
Jones, T. E	Belle Fourche, S. Dak	32,855.60
Kelley, A. H	Yuma, Ariz	15,002.11
Kellogg, C. W	Hermiston, Oreg	8,011.61
Le Claire, E. B	Huntley, Mont	13,329.84
Meglasson, W. H	St. Ignatius, Mont	30,420.43
Moore, Geo. E	Moran, Wyo	21.95
Murray, M. T	Mitchell, Nebr	11,906.16
Neely, T. F	Montrose, Colo	19,726.68
Nivens, Frank	Poplar, Mont	11,901.16
Olsen, Swan T	Elephant Butte, N. Mex	5,626.29
Parker, Wm. T	Malta, Mont	8,023.44
Philebaum, E. M	Sunnyside, Wash	34,870.35
Post, John R	Fallon, Nev	20,319.97
Prescott, E. H	Moran, Wyo	12,200.31
Reid, R. M	St. Ignatius, Mont	31,125.88
Segall, John L	Provo, Utah	30,864.20
Spencer, Jas. W	Orland, Cal	25,632.79
Ummel, J. R	Pathfinder, Wyo	16,692.64
Yates, H. A	Okanogan, Wash	17,527.38
General Land Office receivers		455.48
Total		930,834.74

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DISBURSEMENTS, COLLECTIONS, AND TRANSFERS

In three tables below are shown the expenditures, collections, and transfers between projects to June 30, 1911. Table 7 shows total disbursements for all operations amounting to $66,305,918.77; Table 8 shows total collections amounting to $5,365,084.69; and Table 9 shows the value of equipment, material, supplies, and services transferred between projects to be $3,329,611.81.

In addition to the figures presented in these three tables, it should be mentioned that a great many collections are made that do not appear, for they are deducted from disbursement vouchers. The most important of these are the charges for meals furnished, for supplies sold through mercantile stores, for cottage rentals, and for electric power furnished contractors.

TABLE 7.—*Disbursement vouchers paid to June 30, 1911*

By fiscal years		By fiscal quarters			By calendar years	
Year	Amount	Quarter ended—	No. of vouchers	Amount	Year	Amount
1903	$269,094.47	Sept. 30, 1902	123	$18,251.51	[1]1902	$98,981.37
		Dec. 31, 1902	587	80,729.86		
		Mar. 31, 1903	632	82,601.13		
		June 30, 1903	740	87,511.97	1903	690,174.62
1904	1,513,431.22	Sept. 30, 1903	1,778	217,021.46		
		Dec. 31, 1903	2,364	303,040.06		
		Mar. 31, 1904	2,029	321,625.62		
		June 30, 1904	2,726	671,744.08	1904	2,684,307.74
1905	3,767,921.78	Sept. 30, 1904	3,284	812,101.88		
		Dec. 31, 1904	3,878	878,836.16		
		Mar. 31, 1905	3,241	871,721.49		
		June 30, 1905	3,968	1,205,262.25	1905	5,109,538.27
1906	7,107,715.90	Sept. 30, 1905	5,581	1,604,912.35		
		Dec. 31, 1905	5,513	1,427,642.18		
		Mar. 31, 1906	4,900	1,727,511.14		
		June 30, 1906	5,969	2,347,650.23	1906	9,585,708.74
1907	12,533,916.06	Sept. 30, 1906	7,103	2,721,978.31		
		Dec. 31, 1906	7,815	2,788,569.06		
		Mar. 31, 1907	8,380	3,682,704.32		
		June 30, 1907	9,217	3,340,664.37	1907	13,817,634.58
1908	11,775,419.52	Sept. 30, 1907	9,127	3,471,601.07		
		Dec. 31, 1907	7,753	3,322,664.82		
		Mar. 31, 1908	6,798	2,482,944.74		
		June 30, 1908	7,170	2,498,208.89	1908	10,228,512.55
1909	10,269,005.76	Sept. 30, 1908	7,742	2,434,448.46		
		Dec. 31, 1908	9,016	2,812,910.46		
		Mar. 31, 1909	7,548	2,225,064.85		
		June 30, 1909	8,216	2,796,581.99	1909	9,879,364.63
1910	9,806,075.07	Sept. 30, 1909	8,458	2,301,434.10		
		Dec. 31, 1909	7,902	2,556,283.69		
		Mar. 31, 1910	7,380	2,398,786.27		
		June 30, 1910	8,137	2,549,571.01	1910	9,645,363.12
1911	9,263,338.99	Sept. 30, 1910	7,628	2,303,922.78		
		Dec. 31, 1910	7,784	2,393,083.06		
		Mar. 31, 1911	6,586	1,976,230.02	[1]1911	4,566,333.15
		June 30, 1911	7,889	2,590,103.13		
Total	66,305,918.77		204,962	66,305,918.77		66,305,918.77

[1] Six months.

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TABLE 8.—*Collection vouchers collected to June 30, 1911*

By fiscal years		By fiscal quarters			By calendar years	
Year	Amount	Quarter ended	No. of vouchers	Amount	Year	Amount
1903[1]	$242.37	Mar. 31, 1903	5	$202.21		
		June 30, 1903	13	40.16	1903	$328.66
		Sept. 30, 1903	2	74.31		
1904	710.84	Dec. 31, 1903	3	11.98		
		Mar. 31, 1904	10	416.78		
		June 30, 1904	107	207.77	1904	1,371.06
		Sept. 30, 1904	13	661.32		
1905	1,338.85	Dec. 31, 1904	27	85.21		
		Mar. 31, 1905	74	370.40		
		June 30, 1905	112	221.92	1905	13,032.24
		Sept. 30, 1905	57	6,066.77		
1906	22,924.63	Dec. 31, 1905	109	6,373.15		
		Mar. 31, 1906	138	8,178.25		
		June 30, 1906	60	2,306.46	1906	42,910.06
		Sept. 30, 1906	101	12,864.55		
1907	157,984.45	Dec. 31, 1906	124	19,560.82		
		Mar. 31, 1907	144	47,211.81		
		June 30, 1907	165	78,347.27	1907	427,890.97
		Sept. 30, 1907	310	202,160.11		
1908	530,966.20	Dec. 31, 1907	714	100,171.78		
		Mar. 31, 1908	698	53,262.13		
		June 30, 1908	927	175,372.18	1908	454,174.43
		Sept. 30, 1908	805	61,950.38		
1909	764,418.43	Dec. 31, 1908	936	163,589.74		
		Mar. 31, 1909	906	203,501.85		
		June 30, 1909	1,378	335,376.46	1909	1,168,191.49
		Sept. 30, 1909	1,112	253,857.06		
1910	1,782,691.13	Dec. 31, 1909	873	375,456.12		
		Mar. 31, 1910	964	449,801.22		
		June 30, 1910	1,430	703,576.73	1910	1,875,864.90
		Sept. 30, 1910	628	273,525.93		
1911	2,103,807.79	Dec. 31, 1910	633	448,961.02		
		Mar. 31, 1911	631	652,124.20	[1] 1911	1,381,320.84
		June 30, 1911	896	729,196.64		
Total	5,365,084.69		15,105	5,365,084.69		5,365,084.69

[1] Six months.

TABLE 9.—*Transfer vouchers approved to June 30, 1911*

By fiscal years		By fiscal quarters			By calendar years	
Year	Amount	Quarter ended	No. of vouchers	Amount	Year	Amount
1905[1]	$2,275.45	June 30, 1905	12	$2,275.45		
		Sept. 30, 1905	5	331.30	[2] 1905	$7,704.63
1906	445,806.96	Dec. 31, 1905	20	5,097.88		
		Mar. 31, 1906	48	11,988.55		
		June 30, 1906	227	428,389.23		
		Sept. 30, 1906	87	182,534.09	1906	704,003.5
1907	508,693.42	Dec. 31, 1906	126	81,091.64		
		Mar. 31, 1907	116	78,016.26		
		June 30, 1907	120	167,051.43		
		Sept. 30, 1907	100	84,989.10	1907	1,088,808.73
1908	1,030,342.18	Dec. 31, 1907	93	758,751.94		
		Mar. 31, 1908	53	58,232.88		
		June 30, 1908	182	128,368.26		
		Sept. 30, 1908	239	112,774.86	1908	489,434.02
1909	534,618.33	Dec. 31, 1908	232	190,058.02		
		Mar. 31, 1909	193	132,980.39		
		June 30, 1909	224	98,805.06		
		Sept. 30, 1909	254	96,387.55	1909	417,215.06
1910	365,820.57	Dec. 31, 1909	246	89,042.06		
		Mar. 31, 1910	226	92,819.85		
		June 30, 1910	259	87,571.11		
		Sept. 30, 1910	223	96,844.43	1910	379,471.32
1911	442,054.90	Dec. 31, 1910	226	102,235.93		
		Mar. 31, 1911	233	130,522.40		
		June 30, 1911	234	112,452.14	[3] 1911	242,974.54
Total	3,329,611.81		3,978	3,329,611.81		3,329,611.81

[1] Three months. [2] Nine months. [3] Six months.

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INVESTMENT IN PROJECTS

While the cash transactions alone do not fully show the financial status of the service and the several projects undertaken by it, they do show the actual amount invested in each undertaking, and represent nearly 95 per cent of the total expense incurred. For convenience the various work under way is grouped under five general heads, as follows: Primary projects, those for which definite allotments of funds are in effect and on which in most cases construction is under way or can soon be taken up or which have been completed; secondary projects, those for which no definite allotments of funds are in effect and on which in most cases preliminary studies and surveys have been made to determine their feasibility and practicability; town-site operations under the acts of April 16 and June 27, 1906 (34 Stat., 116, 519), the expense of which is not reimbursable; Indian irrigation, projects on Indian reservations undertaken for the Office of Indian Affairs and for which repayment is made monthly by that office to the extent of the actual expense incurred; and general accounts for those expenditures that can not be directly charged to any project when first incurred but are subsequently transferred to projects on the basis of the benefits received. Tables 10, 11, and 12 show the total voucher transactions and net investment on each undertaking of these classes, and Table 13 gives a recapitulation of all such transactions.

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TABLE 10.—*Voucher transactions and net investments of the United States on primary projects to June 30, 1911*

State	Project	Debits		Credits			Net investment
		Disbursement vouchers	Transfers received	Collection vouchers		Transfers issued	
				Miscellaneous	Water-right charges		
Arizona	Salt River	$9,970,429.67	$257,968.74	$921,492.65	$100,000.00	$42,468.20	$9,164,437.56
Arizona-California	Colorado River	42,185.70	7,159.61	760.32		4,925.26	43,659.73
Do	Yuma	4,441,523.18	125,749.78	189,767.89	52,871.99	10,764.87	4,313,868.21
California	Orland	486,415.79	28,866.99	12,586.56		3,691.69	499,004.53
Colorado	Grand Valley	78,522.64	8,049.03	35.69		2,852.27	83,683.71
Do	Uncompahgre	4,602,902.76	101,680.83	185,310.80		9,575.16	4,509,697.63
Idaho	Boise	4,499,981.38	133,368.38	80,451.98		37,372.72	4,515,525.06
Do	Minidoka	3,973,928.38	202,168.80	45,261.09	307,748.24	81,871.28	3,741,216.57
Kansas	Garden City	378,651.21	11,135.78	4,369.20	247.00	5,140.70	380,030.09
Montana	Huntley	1,063,543.03	37,783.58	31,954.31	127,912.82	87,986.72	853,472.76
Do	Milk River	897,915.26	58,773.88	13,422.09		31,779.06	911,487.99
Do	Sun River	783,103.38	50,437.67	10,840.91	45,020.41	9,186.38	768,493.35
Montana-North Dakota	Lower Yellowstone	2,929,574.57	75,553.86	38,282.76	23,683.00	20,720.67	2,922,442.00
Nebraska-Wyoming	North Platte	4,728,464.27	592,193.00	60,045.68	113,951.76	15,694.08	5,130,965.75
Nevada	Truckee-Carson	4,183,746.26	177,382.80	33,817.05	195,933.05	28,032.25	4,103,346.71
New Mexico	Carlsbad	731,317.84	17,434.30	15,482.35	151,238.30	10,850.12	571,181.37
Do	Hondo	367,430.49	11,312.18	28,782.69		747.78	349,212.20
New Mexico-Texas	Rio Grande	309,630.86	57,430.17	67,210.96		9,103.32	290,746.75
North Dakota	Missouri River Pumping	856,673.37	173,543.38	7,009.86	9,993.15	167,739.01	845,474.73
Oklahoma	Cimarron	8,577.96	321.76			26.55	8,873.17
Oregon	Central Oregon	43,014.03	1,744.30	1,278.58		3,063.08	40,416.67
Do	Umatilla	1,387,628.61	39,961.47	35,928.70	141,124.21	44,145.86	1,206,391.31
Oregon-California	Klamath	2,014,336.06	50,470.84	39,939.43	192,614.23	19,777.17	1,812,476.07
South Dakota	Belle Fourche	2,751,822.55	68,564.64	18,054.36	101,998.83	16,988.96	2,683,345.04
Utah	Strawberry Valley	1,240,312.93	45,405.36	64,670.53		6,635.86	1,214,411.90
Washington	Okanogan	591,852.54	19,720.61	9,064.06	54,907.07	7,735.53	539,866.49
Do	Yakima	5,130,258.70	536,404.03	322,573.35	309,568.37	129,339.18	4,905,181.83
Wyoming	Shoshone	3,701,952.60	111,040.65	70,870.73	121,757.05	40,116.19	3,580,249.28
Total		62,195,696.02	3,001,626.42	2,309,264.58	2,050,569.48	848,329.92	59,989,158.46

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TABLE 11.—*Voucher transactions and net investments of the United States on secondary projects to June 30, 1911*

State	Project	Debits		Credits		Net investment
		Disbursement vouchers	Transfers received	Collection vouchers	Transfers issued	
Arizona	Little Colorado	$9,515.33	$40.00	1.00	.....	$9,554.33
Do	San Carlos	24,589.74	243.74	12.90	.....	24,820.58
Do	San Pedro	2,423.72	3.97	.35	.....	2,427.34
California	Owens Valley	25,957.91	121.00	14,016.99	.....	12,061.92
Do	Sacramento Valley	52,486.13	2,973.62	91.79	$11,843.69	43,524.27
Do	San Joaquin	3,448.92	82.48	.20	.....	3,531.20
Colorado	White River	4,348.04	5.06	.15	.....	4,352.95
Idaho	Dubois	21,464.03	834.98	1.81	5,068.29	17,228.91
Do	Port Neuf	2,165.77	2.24	.....	.....	2,168.01
Montana	Clark Fork	5,417.71	433.67	.25	269.90	5,581.23
Do	Crow Reservation	21,029.47	5.01	1.90	2,120.62	18,911.96
Do	Lake Basin	7,044.39	79.87	.....	21.00	7,103.26
Do	Madison River	10,795.45	2.57	1.85	67.08	10,729.09
Do	Marias	13,878.31	93.30	1.55	632.20	13,337.86
Nebraska	South Platte	1,913.96	963.05	.....	.....	2,877.01
Nevada	Walker River	12,450.48	53.15	.....	.....	12,503.63
New Mexico	La Plata	29,598.20	168.55	1,702.42	.....	28,064.33
Do	Las Vegas	5,012.16	2.23	.30	.....	5,014.09
Do	Urton Lake	19,330.65	273.71	1,225.51	914.15	17,464.70
North Dakota	Bismarck	16,709.04	26.69	14.70	3,099.34	13,621.69
Do	Little Missouri	11,631.54	1,743.05	1.00	1,439.82	11,933.77
Do	Nesson	7,491.51	29,786.35	4.14	19,801.89	17,471.83
Do	Washburn	9,950.70	1,973.89	42.38	1,350.68	10,531.53
Do	Bowman	3,648.96	1,508.66	.50	1,091.09	4,066.03
Oklahoma	Red River	59,413.75	1,902.64	161.77	939.50	60,215.12
Oregon	Malheur	82,592.87	4,293.93	279.80	3,116.73	83,490.27
Utah	Bear Lake	18,859.06	30.72	62.06	.....	18,827.72
Do	Utah Lake	34,044.67	9.25	4.62	.....	34,049.30
Washington	Palouse	76,558.48	359.52	126.38	400.00	76,391.62
Do	Priest Rapids	6,218.98	247.58	250.55	.....	6,216.01
Wyoming	De Smet	9,053.32	2.51	39.55	98.90	8,917.38
Total	.....	609,043.25	48,266.99	18,046.42	52,274.88	586,988.94

TABLE 12.—*Voucher transactions and net investments of the United States on town-site development, Indian irrigation, and miscellaneous to June 30, 1911*

Item	Debits		Credits		Net investment
	Disbursement vouchers	Transfers received	Collection vouchers, miscellaneous	Transfers issued	
Town-site development:					
Idaho, Minidoka project	$2,904.37	$4,815.97	.....	$20.00	$7,700.34
Montana—					
Huntley project	106.05	1,085.72	$4.00	.....	1,187.77
Sun River project	111.23	920.60	1.50	.....	1,030.33
South Dakota—					
Belle Fourche project	324.19	1,337.65	.....	213.51	1,448.33
Wyoming—					
Shoshone project	232.61	1,401.77	4.10	.....	1,630.28
Total	3,678.45	9,561.71	9.60	233.51	12,997.05
Indian irrigation:					
Montana—					
Blackfeet project	397,269.82	34,703.25	340,243.21	6,154.71	85,575.15
Flathead project	637,984.13	44,162.44	487,241.57	4,746.58	190,158.42
Fort Peck project	169,462.09	22,244.86	142,781.03	7,267.26	41,658.66
Total	1,204,716.04	101,110.55	970,265.81	18,168.55	317,392.23
Miscellaneous:					
General accounts	1,411,915.38	111,477.38	15,102.88	1,473,992.48	34,297.40
Closed accounts	880,869.63	57,568.76	1,825.92	936,612.47	.....
Total	2,292,785.01	169,046.14	16,928.80	2,410,604.95	34,297.40

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TABLE 13.—*Recapitulation and verification of voucher transactions and all net investments of the United States paid from the reclamation fund to June 30, 1911*

Item	Debits		Credits			Net Investment
	Disbursement vouchers	Transfers issued	Collection vouchers		Transfers issued	
			Miscellaneous	Water-right charges		
Primary projects	$62,195,696.02	$3,001,626.42	$2,309,264.58	$2,050,569.48	$848,329.92	$59,989,158.46
Secondary projects	609,043.25	48,266.99	18,046.42	.....	52,274.88	586,988.94
Town-site development	3,678.45	9,561.71	9.60	.....	233.51	12,997.05
Indian irrigation	1,204,716.04	101,110.55	970,265.81	.....	18,168.55	317,392.23
Miscellaneous	2,292,785.01	169,046.14	16,928.80	.....	2,410,604.95	34,297.40
Total	66,305,918.77	3,329,611.81	3,314,515.21	2,050,569.48	3,329,611.81	60,940,834.08

ANALYSIS OF COLLECTIONS

All moneys collected under the operations of the Reclamation Service are authorized either by section 4 of the reclamation act (32 Stat., 388), by sections 2 and 4 of the act of April 16, 1906 (34 Stat., 116), or by the act of March 3, 1905 (33 Stat., 1032). Collections under the first law mentioned are repayments of cost. Collections under sections 2 and 4 of the act of April 16, 1906, and the act of March 3, 1905, are reductions of the cost of the projects.

Under the authority of these acts there has been collected a total of $5,365,084.69. Of this, $25,796.14 is repayment of overpayments and is a reduction of disbursements. The balance, $5,339,288.55, represents actual cash receipts, of which $2,050,569.48 are repayments of cost and $3,288,719.07 are reductions of cost. Those collections which operate as repayments of cost are received from the water users in settlement of building and operation and maintenance charges under public notices issued by the Secretary of the Interior. The collections which result in reductions of the cost of projects arise from a number of sources, all of which are incidental to the work under the reclamation act. Table 14 shows the sources of cash collections, by calendar years, and Table 15 shows the amounts collected for water rights, by projects, to June 30, 1911.

TABLE 14.—*Sources of cash collections to June 30, 1911, by calendar years*

Calendar year	Miscellaneous sales	Miscellaneous services	Temporary water rentals	Transportation refunds	Forfeitures by bidders and contractors	Water-right repayments		Overdisbursements	Total
						Building charges	Operation and maintenance charges		
1903	.....	.....	.....	.....	.....	.....	.....	$328.66	$328.66
1904	.....	.....	.....	.....	.....	.....	.....	1,371.08	1,371.08
1905	$2,483.55	.....	.....	$693.88	$9,000.00	.....	.....	854.81	13,032.24
1906	22,441.97	$300.00	.....	16,492.42	.....	.....	.....	3,675.69	42,910.08
1907	79,650.57	13,637.27	$128,534.23	62,943.00	.....	$126,542.44	$4,124.94	12,458.52	427,890.97
1908	96,776.40	59,232.51	188,134.29	9,668.98	1,000.00	77,984.64	20,350.33	1,027.28	454,174.43
1909	81,545.19	441,612.18	261,158.93	62,411.63	24,000.00	231,900.98	64,290.63	1,271.95	1,168,191.49
1910	125,111.45	529,233.67	353,716.60	38,096.82	.....	631,788.77	194,598.65	3,318.94	1,875,864.90
1911[1]	39,327.51	426,831.34	203,964.05	8,944.42	1,776.21	464,958.80	234,029.30	1,489.21	1,381,320.84
Total	447,336.64	1,470,846.97	1,135,508.10	199,251.15	35,776.21	1,533,175.63	517,393.85	25,796.14	5,365,084.69

[1] Six months.

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TABLE 15.—*Collection of water-right charges by projects to June 30, 1911*

State	Project	Building charges	Operation and maintenance charges	Total	Refunds	Net collections
Arizona	Salt River	[1] $100,000.00		$100,000.00		$100,000.00
Arizona-California	Yuma	40,388.99	$12,483.00	52,871.99		52,871.99
Idaho	Minidoka	238,373.96	69,374.28	307,748.24		307,748.24
Kansas	Garden City	142.50	104.50	247.00	$247.00	
Montana	Huntley	99,629.59	28,283.23	127,912.82	160.48	127,752.34
Do	Sun River	36,578.46	8,441.95	45,020.41	465.32	44,555.09
Montana-North Dakota	Lower Yellowstone	11,322.00	12,361.00	23,683.00		23,683.00
Nebraska-Wyoming	North Platte	96,385.15	17,566.61	113,951.76	146.40	113,805.36
Nevada	Truckee-Carson	139,239.69	56,693.36	195,933.05		195,933.05
New Mexico	Carlsbad	81,554.80	69,683.50	151,238.30		151,238.30
North Dakota	Missouri River pumping.	2,706.32	7,286.83	9,993.15	153.00	9,840.15
Oregon	Umatilla	114,004.60	27,119.61	141,124.21		141,124.21
Oregon-California	Klamath	140,121.65	52,492.58	192,614.23		192,614.23
South Dakota	Belle Fourche	60,313.95	41,684.88	101,998.83		101,998.83
Washington	Okanogan	22,598.07	32,309.00	54,907.07	52.50	54,854.57
Do	Yakima:					
	Sunnyside unit	258,065.35	34,205.17	292,270.52	1,095.75	291,174.77
	Tieton unit	4,250.10	13,047.75	17,297.85		17,297.85
Wyoming	Shoshone	87,500.45	34,256.60	121,757.05	245.85	121,511.20
Total		1,533,175.63	517,393.85	2,050,569.48	2,566.30	2,048,003.18

[1] Collection through auditor's office for lands of Pima Indians.

BALANCE SHEETS OF ASSETS AND LIABILITIES

The Reclamation Service includes in its accounts not only the cash transactions and accrued current assets and liabilities, but also the capital assets, realization upon which must under the law be deferred and the capital liability represented by a reimbursable special fund that must ultimately be returned to the Treasury of the United States. An independent account is kept for each project, covering all current assets and liabilities, including cost of work as an asset to be realized upon in the future, and net investment of the United States as a liability to the Reclamation Service. A balance sheet is prepared for each project and the director's office monthly. For the entire service these balance sheets are combined into a consolidated balance sheet, into which are brought the assets for cash in the Treasury and with fiscal officers and the capital liability for the appropriation, reclamation fund. Table 16 is a statement of assets and liabilities at the close of accounts on June 30, 1911, made up from the consolidated balance sheet. Table 17 is a statement of project cost supporting the item "Cost of work" in Table 16. Tables 18, 19, and 20 are statements of assets and liabilities for the director's office, the secondary projects, and the Indian irrigation projects, respectively, on June 30, 1911. The statements of assets and liabilities for the primary projects are given in the body of this report under the project headings.

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TABLE 16.—*Consolidated statement of assets and liabilities for operations under reclamation fund to June 30, 1911*

ASSETS

Cash (as per Table 4):			
With Treasurer of the United States		$3,713,132.50	
In depositories to credit of special fiscal agents		930,834.74	
Cash (as per Table 21):			
With Treasurer of the United States		253,168.19	
In depositories to credit of special fiscal agents		63,261.35	
			$4,960,396.78
Accounts receivable:			
Uncollected freight refunds		2,708.72	
Uncollected water rentals		42,539.49	
Uncollected miscellaneous rentals		61,383.09	
Uncollected miscellaneous		223,153.04	
Collections by General Land Office		7,041.72	
Uncollected water-right building charges		1,692,248.48	
Uncollected water-right operation and maintenance charges		147,343.68	
			2,176,418.22
Inventories:			
Mercantile stores		43,494.06	
Government animals		232,967.63	
Equipment in use	$1,120,067.69		
Less depreciation	142,825.61		
		977,242.08	
Storehouses		702,912.59	
Cement		87,644.60	
Iron and steel		33,618.73	
Lumber		136,134.22	
Explosives		20,240.09	
Forage		51,741.95	
Fuel		17,807.96	
Cash in project offices		10,009.35	
Local products		45,519.33	
Unadjusted transfers		4,461.08	
Freight and handling undistributed		45,087.75	
			2,408,881.42
Cost of work:			
Building cost		63,389,809.65	
Less adjustments	$350,590.72		
Less accrued revenues	2,366,136.40		
		2,716,727.12	
			60,673,082.53
Operation and maintenance cost		2,423,109.31	
Less accrued revenues		371,462.97	
			2,051,646.34
Total assets			72,270,425.29

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LIABILITIES

Capital:		
Reclamation fund (reimbursable), as per Table 5	$65,584,801.32	
Rio Grande Dam appropriation (nonreimbursable) as per Table 21	1,000,000.00	
		$66,584,801.32
Accounts payable:		
Unpaid labor	316,475.80	
Unpaid purchases	380,634.32	
Unpaid contract estimates	313,483.26	
Unpaid contract holdbacks	153,103.15	
Unpaid freight and express	218,598.27	
Unpaid passenger fares	5,820.51	
Unpaid land agreements	144,504.22	
Unredeemed coupon books	2,424.10	
Unredeemed meal tickets	3,968.23	
Unpaid miscellaneous	18,946.17	
		1,557,958.03
Repayments accrued:		
Building charges	3,364,465.89	
Operation and maintenance charges	733,892.10	
Collections in advance of accruals	29,307.95	
		4,127,665.94
Total liabilities		72,270,425.29

TABLE 17.—*Project gross costs to June 30, 1911*

State	Project	Building	Operation and maintenance
Arizona	Salt River	$9,878,521.47	
Arizona-California	Colorado River	43,659.73	
Do	Yuma	4,314,303.67	$32,683.46
California	Orland	505,000.54	
Colorado	Grand Valley	76,716.79	
Do	Uncompahgre	4,576,682.45	
Idaho	Boise	4,679,623.28	
Do	Minidoka	3,978,737.79	307,700.17
Kansas	Garden City	387,710.70	
Montana	Huntley	843,468.32	135,619.73
Do	Milk River	850,569.52	2,723.61
Do	Sun River	739,400.74	36,526.57
Montana-North Dakota	Lower Yellowstone	2,771,672.15	186,008.74
Nebraska-Wyoming	North Platte	4,780,349.19	479,152.88
Nevada	Truckee-Carson	3,917,698.48	330,871.20
New Mexico	Carlsbad	605,687.19	125,955.99
Do	Hondo	352,788.30	
New Mexico-Texas	Rio Grande	273,260.37	
Do	Rio Grande Dam	683,570.46	
North Dakota	Missouri River pumping	713,414.06	135,732.26
Oklahoma	Cimarron	8,755.79	
Oregon	Central Oregon	40,293.10	
Do	Umatilla	1,232,680.59	95,179.14
Oregon-California	Klamath	1,970,560.35	87,434.95
South Dakota	Belle Fourche	2,808,714.75	77,414.12
Utah	Strawberry Valley	1,213,792.97	
Washington	Okanogan	565,225.73	27,443.17
Do	Yakima	5,120,690.16	297,822.22
Wyoming	Shoshone	3,697,298.81	64,841.10
Secondary projects		581,896.22	
Town-site development		12,997.05	
Director's office (undistributed)		4,082.69	
Montana	Indian projects	1,159,986.24	
Total		63,389,809.65	2,423,109.31

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TABLE 18.—*Assets and liabilities on June 30, 1911, director's office*

ASSETS

Accounts receivable:			
Uncollected miscellaneous			$217.86
Inventories:			
Equipment in use	$22,603.61		
Less depreciation	3,219.45		
		$19,384.16	
Storehouse		14,204.92	
Local products		2,265.02	
Freight and handling undistributed		2,184.13	
			38,038.23
Cost of work:			
Building cost		4,082.69	
Less accrued revenues		1,009.02	
			3,073.67
Total assets			41,329.76

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$1,411,915.38		
Transfer vouchers received	111,477.38		
		1,523,392.76	
Collection vouchers	15,102.88		
Transfer vouchers issued	1,473,992.48		
		1,489,095.36	
			34,297.40
Accounts payable:			
Unpaid labor		182.17	
Unpaid purchases		5,100.01	
Unpaid freight and express		72.77	
Unpaid passenger fares		1,230.37	
Unpaid miscellaneous		447.04	
			7,032.36
Total liabilities			41,329.76

TABLE 19.—*Assets and liabilities on June 30, 1911, secondary projects*

ASSETS

Inventories:			
Government animals		$295.00	
Equipment in use		1,115.05	
Storehouse		3,682.67	
			$5,092.72
Cost of work—building cost			581,896.22
Total assets			586,988.94

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$609,043.25		
Transfer vouchers received	48,266.99		
		657,310.24	
Collection vouchers	18,046.42		
Transfer vouchers issued	52,274.88		
		70,321.30	
			586,988.94
Total liabilities			586,988.94

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TABLE 20.—*Assets and liabilities on June 30, 1911, Indian irrigation projects*

ASSETS

Accounts receivable:			
Uncollected freight refunds		$181.49	
Uncollected miscellaneous		119,454.34	
			$119,635.83
Inventories:			
Mercantile store		12,828.99	
Government animals		50,182.55	
Equipment in use	$74,755.02		
Less depreciation	3,176.05		
		74,578.97	
Storehouse		37,910.64	
Cement		1,549.53	
Iron and steel		120.47	
Lumber		8,862.57	
Explosives		606.13	
Forage		11,182.42	
Fuel		230.29	
Cash in office safe		716.95	
Local products		895.10	
Unadjusted transfers		157.85	
Freight and handling undistributed		3,587.63	
			203,410.09
Cost of work:			
Building cost	1,159,986.24		
Plus adjustments	333.83		
		1,160,320.07	
Less adjustments	29,719.18		
Less accrued revenues	1,075,977.16		
		1,105,696.34	
			54,623.73
Total assets			377,669.65

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$1,204,716.04		
Transfer vouchers received	101,110.55		
		1,305,826.59	
Collection vouchers	970,265.81		
Transfer vouchers issued	18,168.55		
		988,434.36	
			317,392.23
Accounts payable:			
Unpaid labor		36,231.74	
Unpaid purchases		10,483.52	
Unpaid freight and express		13,236.85	
Unpaid passenger fares		148.31	
Unredeemed coupon books		134.25	
Unpaid miscellaneous		42.75	
			60,277.42
Total liabilities			377,669.65

Summary of cost of Indian projects

Montana:	
Blackfeet	$382,413.32
Flathead	597,137.85
Fort Peck	180,435.07
Total building cost as per debit in cost of work in statement of assets and liabilities	1,159,986.24

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EXPLANATION OF ASSETS AND LIABILITIES

The significance of the data shown in the statements of assets and liabilities for projects will be better understood after consideration of the following explanation of the items entering into the foregoing general statement of assets and liabilities.

The several items appear in the statement of assets and liabilities in the order in which they can or must be liquidated.

The accounts receivable are shown under seven heads, as follows: Uncollected freight refunds, consisting of claims against railroads for contract concessions upon freight moved for contractors on irrigation work; uncollected water rentals, consisting of claims against irrigators for water furnished under rental contract; uncollected miscellaneous rentals, consisting of claims against the lessees of lands or buildings under the control of the service; uncollected miscellaneous, consisting of claims against contractors or other persons for services or materials furnished that will be deducted from current earnings by them; collections by General Land Office, consisting of collections of water-right building and operation and maintenance charges by special fiscal agents and transmitted to local land offices but not yet covered into the Treasury by the receivers of land offices; uncollected water-right building charges and uncollected water-right operation and maintenance charges, consisting of claims against water-right applicants for the portions of annual installments of water-right charges that have accrued under their applications but that have not become delinquent.

The inventories are self-explanatory, but an explanation of the methods of handling these accounts will make them more easily understood. With the regular use of Government equipment there is a deterioration in value that should be written off from these asset accounts and included with that of cost of work. Actual depreciation is determined from time to time by surveys and appraisals or by sale, but pending such determination estimated wear and tear is credited to the respective accounts for depreciation and debited to cost of work, to be more accurately adjusted when appraisals or sales are made. Unadjusted transfers are for materials or services furnished by one project to another for which the vouchers have not been checked so as to warrant their entry to the proper accounts under inventories or cost of work.

Cost of work represents the outlay upon the net asset in the irrigation projects, for which reimbursement will later be required from the water-right applicants. The bulk of the outlay is shown in the two accounts, building cost and operation and maintenance cost. Table 17 shows the cost of each project for building and operation and maintenance. The amount appearing in these two accounts is analyzed for each project in a subsidiary statement that shows the cost of the principal physical features. A table showing an analysis of these costs by features is given in this report under each project. In computing the current costs for such features there are certain expenses that can not be accurately determined when incurred, but that are estimated as closely as possible, subject to readjustment at a later time. The expenses that must be thus estimated do not represent a large proportion of the cost of any feature of the work, but are numerous and varied in kind. Most of them arise from what are

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known as incidental operations, such as power plants, manufacturing shops, storehouses, mess houses, mercantile stores, etc. The net gain or loss on such operations is a decrease or increase of the actual cost of the project and of the features to which they have contributed. It is usually impracticable to revise and readjust the charges made for the benefits that these incidental operations have contributed to the various features, and therefore the gains or losses are applied only to the cost of the project as a whole. The projects derive various revenues from dealings with the general public, such as rentals of lands and buildings, payment for services performed at its manufacturing shops, rentals of irrigating water, etc. These revenues do not reduce the original cost of the features whose operations produce the revenues, but they do reduce the cost of the entire project. The net cost of a project is therefore obtained from the building cost, operation and maintenance cost, adjustments, and revenues.

The capital account represents the indebtedness of the service to the United States. The reclamation fund is ultimately reimbursable and therefore a liability. The amount of the liability would be the total amount appropriated to it, except that the acts of April 16 and June 27, 1906 (34 Stat., 116, 519), make the disbursements therefrom for the development of certain town sites a final expenditure that is not repayable to the service and accordingly not reimbursable to the United States. The total amount of such expenditures for town-site operations to June 30, 1911, is $12,997.05. The law, furthermore, makes no provision for the return to the reclamation fund of amounts expended on the investigation of projects that prove ultimately to be not feasible.

The accounts payable are shown under ten heads, as follows: Unpaid labor, consisting of claims in favor of employees for services performed, the greater part of which is always paid on or before the tenth of the following month; unpaid purchases, consisting of claims in favor of merchants for current bills, most of which are paid during the following month; unpaid contract estimates and unpaid contract holdbacks, both consisting of claims in favor of contractors upon construction work, the former representing the amount now due and that will be paid as soon as settled by the auditor, and the latter representing the amount withheld until the completion of the work under the provisions of the contract; unpaid freight and express and unpaid passenger fares, consisting of claims in favor of transportation companies, both representing the estimated indebtedness for transportation furnished by carriers, the respective charges being secured for freight from delivering agents' expense bills, for express from deliving agents' oral statements of the charges, and for passenger fares from ticket sellers' oral statements of the fares; unpaid land agreements, consisting of claims in favor of the grantors of real property upon negotiated contracts for the acquisition of their titles and not payable until complete investigation of such titles and final determination of the exact amounts payable to the grantors; unredeemed coupon books and meal tickets, consisting of employees' claims that are not payable in cash except upon discharge, but for which they are entitled to receive appropriate issues at the mercantile stores and mess houses; and unpaid miscellaneous, consisting of claims payable in cash that do not properly come within the limits of the foregoing classes of liabilities.

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The repayment accounts are set forth separately and treated as liabilities, as it is desirable to show the total amount of repayments accrued. They might, perhaps, very properly be considered as a reduction of the asset account "cost of work," since that account, as an asset, is reduced by repayments.

ENGLE DAM

The act of March 4, 1907 (34 Stat., 1357), provided an appropriation of $1,000,000 toward the construction of a dam in the bed of the Rio Grande for storing and delivering water, as provided by a convention between the United States and Mexico. Tables 21, 22, and 23 show the transactions under this appropriation and its condition on June 30, 1911, and are similar to the tables relating to the reclamation fund.

TABLE 21.—*Special appropriation for Rio Grande (Engle) Dam (34 Stat., 1357) to June 30, 1911*

	Debit	Credit
Appropriation warrant No. 19, Mar. 4, 1907		$1,000,000.00
Disbursements, 2,353 vouchers	$683,655.54	
Collections, 21 vouchers		85.08
Balance with Swan T. Olsen, special fiscal agent	29,203.25	
Balnce with Jay Brown, special fiscal agent	34,058.10	
Balance with Treasurer of United States	253,168.19	
Total	1,000,085.08	1,000,085.08

TABLE 22.—*Balances of appropriations for Rio Grande (Engle) Dam with Treasurer of the United States, June 30, 1907, to June 30, 1911* [1]

Fiscal year	Appropriation	Withdrawals	Balances
1907	$1,000,000		$1,000,000.00
1908		$33,113.21	966,886.79
1909		137,074.22	829,812.57
1910		247,217.23	582,595.34
1911		327,875.96	254,719.38
Totals and balance per Treasury accounts, June 30, 1911	1,000,000	745,280.62	254,719.38
To reconcile with accounts of the Reclamation Service: For items not in above but in Rio Grande (Engle) Dam appropriation accounts, per direct settlement by the Auditor, add to withdrawals		1,551.19	1,551.19
Total and balance per Reclamation Service accounts	1,000,000	746,831.81	253,168.19

[1] The appropriations and balances shown in this table for the fiscal years 1907, 1908, 1909, 1910, and 1911 are taken from the books and financial statements of the Treasury Department.

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TABLE 23.—*Disbursement and collection vouchers, appropriation for Rio Grande (Engle) Dam, paid and collected to June 30, 1911*

Quarter ended	Disbursement vouchers		Collection vouchers	
	Number	Amount	Number	Amount
Mar. 31, 1908	78	$7,888.14		
June 30, 1908	144	16,717.46	16	$68.70
Sept. 30, 1908	163	22,484.55	1	5.00
Dec. 31, 1908	137	33,749.30		
Mar. 31, 1909	199	26,836.99	1	1.52
June 30, 1909	184	38,325.24		
Sept. 30, 1909	46	8,056.42		
Dec. 31, 1909	110	22,692.24		
Mar. 31, 1910	40	8,587.13	1	3.70
June 30, 1910	53	205,325.44		
Sept. 30, 1910	101	10,221.22		
Dec. 31, 1910	189	72,453.65		
Mar. 31, 1911	332	67,243.08		
June 30, 1911	577	143,074.68	2	6.16
Total	2,353	683,655.54	21	85.08

RECLAMATION DEPOSIT ACCOUNT

The Treasury Department, in a letter to the Secretary of the Interior, dated December 18, 1909, authorized the opening of an account known as the "reclamation deposit account," in which are deposited to the official credit of the special fiscal agent of the Reclamation Service, located at Washington, D. C., the amounts of all certified checks received with proposals to insure the execution of contracts and bonds in the event of the proposals being accepted. After award of contract and execution of bond by a successful bidder, the amounts deposited by all bidders under the same advertisement are returned by check of the special fiscal agent. The account was opened May 31, 1910. Transactions in this account are shown by tables 24 and 25.

TABLE 24.—*Receipts and payments from reclamation deposit account during fiscal year 1911*

Date	Receipts	Payments	Balances
	[1] $522		
July, 1910	25,000	$522	$25,000
August, 1910	24,750	38,500	11,250
September, 1910	7,000		18,250
October, 1910	30,800	15,050	34,000
November, 1910	11,740	26,600	19,140
December, 1910	19,600	2,810	35,930
January, 1911	11,800	12,230	35,500
February, 1911	200	27,750	7,950
March, 1911	22,140	8,550	21,540
April, 1911	22,800	16,180	28,160
May, 1911	23,550	10,500	41,210
June, 1911	14,456	28,860	26,800
Total	214,352	187,552	

[1] Balance on hand.

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TABLE 25.—*Items included in balance of $26,800, given in Table 24*

OUTSTANDING CHECKS JUNE 30, 1911

Number	Date	Payee	Amount
8175	June 22	H. P. Marsing	$200
8176	...do.....	Maney Bros. & Co	525
8177	...do.....	W. H. Thompson	525
8178	...do.....	Thomas Dixon	150
8179	...do.....	Standard Underground Cable Co	700
8181	...do.....	American Steel & Wire Co	700
8182	June 29	L. W. Datson and Lee Shirley	200
8183	...do.....	J. W. McNeel	200
8184	...do.....	B. W. Gauns	200
8185	...do.....	S. L. Smith	100
8186	...do.....	W. C. Broadbent	100
8187	...do.....	Jesse Heieds	200
8188	...do.....	W. L. Townsend	200
8189	...do.....	Albert Langpre	200
8190	...do.....	Arnold Glassie Co	100
8191	...do.....	A. T. Adams	100
8192	...do.....	H. K. Porter Co	500
8193	...do.....	American Locomotive Co	500
8194	...do.....	Vulcan Iron Works	500
8195	...do.....	Baldwin Locomotive Works	500
8196	...do.....	General Electric Co	1,000
8197	...do.....	Fort Wayne Electric Works (Inc.)	1,000
8198	June 30	.....do	1,000
8199	...do.....	M. L. Bayard & Co	1,000
8200	...do.....	Walker Electric Co	1,000
515501	...do.....	Allis-Chalmers Co	1,000
515501	...do.....	Chas. C. Moore & Co	1,000
515503	...do.....	Henry R. Worthington	1,000
		Total	14,400

Amounts held pending award of contracts

Bid opened	For—	Bidder	Amount
Apr. 27, 1911	Electric apparatus [1]	Westinghouse Electric & Manufacturing Co	$1,000
June 1, 1911	Enlarging Main South Side Canal. [1]	Hoy & Elzy	500
Do	.....do	Maney Bros. & Co	500
June 10, 1911	Branch railway [1]	.....do	1,900
Do	.....do	M. H. Knudsen	700
Do	.....do	Gus Carlson	1,900
Do	.....do	Pacific Paving Co	1,900
May 15, 1911	Steam-power plant [2]	W. E. Anderson	1,000
Do	.....do	General Electric Co	1,000
Apr. 3, 1911	Cement [3]	Henry Cowell Lime & Cement Co	1,000
Do	.....do	Union Portland Cement Co	1,000
	Total		12,400
	Total outstanding checks June 30, 1911		14,400
	Total		26,800

[1] Boise. [2] Rio Grande. [3] Miscellaneous.

UNIT PRICES UNDER FORMAL SPECIFICATIONS

In the table following are given the principal unit prices bid for work and materials and contract unit prices therefor in connection with formal specifications, proposals for which have been received by the Reclamation Service during the fiscal year ending June 30, 1911. Formal specifications issued during the year include those numbered from 165 to 190, inclusive. In almost all cases contracts have been awarded to the lowest bidder, but as the contracts have been awarded on definite devisions of the work as a whole, it has frequently happened that the contract price for a particular item is higher than the lowest bid on that item. Unit bids and contract prices for cement, explosives, headgates, machinery, and electrical equipment are not included in this table.

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Unit bids and contract prices

BACKFILLING

State and project	Date	Specification No.	Feature or description	Unit	Quantity	Bids per unit		Contract price
						Lowest	Next	
Washington: Yakima (Sunnyside)	Nov. 1,1910	169	Prosser division pipe trench	Cubic yard	10,000	$0.30	$0.30	$0.30
Do	do	169	Prosser division diversion dam	do	50	.60	.....	(1)
Washington: Yakima (storage)	Apr. 15,1911	177	Kachess Dam conduits	do	20,000	.40	.45	(1)
Do	do	177	Kachess Dam spillway	do	2,000	.45	.50	(1)

BLANKETING

Washington: Yakima (Sunnyside)	Nov. 1,1910	169	Prosser division distributing canals, selected material, thickness 12 inches.	Cubic yard	1,000	$0.30	$0.80	$0.80

BRIDGES, COMBINATION

Washington: Yakima (Sunnyside)	Nov. 1,1910	169	Prosser division canals, 180-foot span, Pratt trusses	Number	1	$3,700.00	$4,930.00	(1)
Do	do	169	Prosser division canals, 140-foot span, Pratt trusses	do	2	4,600.00	6,940.00	(1)
Do	do	169	Prosser division canals, 44-foot span, I-beam	do	1	450.00	700.00	(1)

BRIDGES, STEEL

Washington: Yakima (Sunnyside)	Nov. 1,1910	169	Prosser division, 180-foot span	Number	1	$5,200.00	$6,975.00	$5,200.00
Do	do	169	Prosser division 132-foot span	do	2	6,000.00	8,525.00	6,000.00
Do	do	169	Prosser division 50-foot span	do	1	500.00	800.00	800.00

BRIDGES, WOODEN STRINGER

Oregon-California: Klamath	Dec. 15,1910	172	Lost River diversion works, 84-foot, 4-span	Number	10	$390.00	$640.00	$640.00
Do	do	172	Lost River diversion works, 60-foot, 3-span	do	1	292.50	492.00	492.00

[1] All bids rejected.

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Unit bids and contract prices—Continued

BROKEN STONE

State and project	Date	Specification No.	Feature or description	Unit	Quantity	Bids per unit		Contract price
						Lowest	Next	
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike	Cubic yard	1,000	$2.85	$3.00	$2.85

CLEARING

Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam site	Acre	25	$100.00	$150.00	(1)
Do	do	177	Kachess Dam spillway site	do	6	100.00	110.00	(1)

CONCRETE, PLAIN AND REENFORCED

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division diversion dam (reenforced)	Cubic yard	55	$15.00		(1)
Do	do	169	Prosser division trestle footings (plain)	do	19	11.51	$15.00	(1)
Do	do	169	Prosser division flume structures (plain)	do	20	12.80	15.00	(1)
Oregon-California: Klamath	Dec. 15, 1910	172	Lost River diversion works dam (reenforced)	do	5,300	10.05	13.00	$10.05
Do	do	172	Lost River diversion works structure (plain)	do	200	14.40	15.00	14.40
Do	do	172	Lost River diversion works structure (reenforced)	do	150	15.50	16.75	16.75
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam (plain)	do	2,500	6.25	6.30	(1)
Do	do	177	Kachess Dam, conduits (reenforced)	do	3,500	6.30	10.00	(1)
Do	do	177	Kachess Dam, gate tower, etc. (reenforced)	do	370	10.00	12.00	(1)
Do	do	177	Kachess Dam spillway (plain)	do	1,700	6.50	7.50	(1)
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike core wall (reenforced)	do	1,700	11.40	12.50	11.40

DRAIN PIPE

Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam, 12-inch, double-strength, glazed	Linear foot	1,000	$0.60	$1.00	(1)
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike, 8-inch, double-strength, vitrified pipe furnished by United States.	do	1,400	.70	.80	$0.80

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DREDGING

Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam, earth and rocks less than one-half cubic yard in volume.	Cubic yard	95,000	$0.30	$0.50	[1]
Do	do	177	Kachess Dam, solid rock	do	500	1.00	2.00	[1]

EMBANKMENT

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division diversion dam	Cubic yard	35	$1.00	.....	[1]
Oregon-California: Klamath	Dec. 15, 1910	172	Lost River diversion works, 8-inch layers, rolling, 2 cents per cubic yard extra; sprinkling, 25 cents per 1,000 gallons of water used.	do	15,000	.24	$0.36	$0.36
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam (hydraulic fill)	do	240,000	.33	.35	[1]
Do	do	177	Kachess Dam (built in 6-inch layers)	do	240,000	.34	.45	[1]
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike, 6-inch layers	do	88,000	.37½	.44	.37½

EXCAVATION, CLASS 1, EARTH

Idaho: Boise	July 8, 1910	165	Widening Main South Side Canal	Cubic yard	130,000	$0.20	$0.28	$0.20
New Mexico: Rio Grande	Aug. 8, 1910	166	Branch railroad, schedule 1	do	1,000	.20	.25	.20
Do	do	166	Branch railroad, schedule 2	do	14,000	.17½	.18	.17½
Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division pipe trench	do	5,000	.25	.30	.25
Do	do	169	Prosser division diversion dam	do	200	.50	.....	[1]
Do	do	169	Prosser division distribution canal	do	21,000	.20	.25	.25
Oregon-California: Klamath	Nov. 30, 1910	170	Lost River diversion channel, schedule 2	do	105,000	.189	.21	.189
Do	do	170	Lost River diversion channel, schedule 3	do	118,000	.189	.21	.189
Do	do	170	Lost River diversion channel, schedule 4	do	105,000	.189	.21	.189
Do	Dec. 15, 1910	172	Lost River diversion works, schedule 1	do	15,000	.40	.54	.54
Do	do	172	Lost River diversion works, schedule 5	do	1,000	.30	.48	.48
South Dakota: Belle Fourche	Feb. 24, 1911	173	North Canal, division 2, schedule 1	do	88,000	.18	.19½	.18
Do	do	173	North Canal, division 2, schedule 2	do	100,000	.18	.18½	.18
Do	do	173	North Canal, division 2, schedule 3	do	90,000	.16¾	.17	.17
Do	do	173	North Canal, division 2, schedule 4	do	75,000	.18	.19	.19
Do	do	173	North Canal, division 2, schedule 5	do	90,000	.18	.19	.19
Do	do	173	North Canal, division 2, schedule 6	do	85,000	.18	.19	.18
Do	do	173	North Canal, division 2, schedule 7	do	87,000	.18	.19½	.18
Do	do	173	North Canal, division 2, schedule 8	do	90,000	.18	.1945	.18
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam	do	50,000	.27	.40	[1]
Do	do	177	Kachess Dam spillway	do	35,000	.21½	.35	[1]
Idaho: Boise	June 1, 1911	182	Enlarging main south side canal	do	1,300	.20	.38	.20

[1] All bids rejected.

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Unit bids and contract prices—Continued

EXCAVATION, TRENCH, CLASS 1, EARTH AND GRAVEL

State and project	Date	Specification No.	Feature or description	Unit	Quantity	Bids per unit		Contract price
						Lowest	Next	
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam outlet channel	Cubic yard	90,000	$0.45	$0.60	(1)
Do	do	177	Kachess Dam trench	do	3,500	.45	2.50	(1)
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike core wall trench	do	650	.75	1.00	$1.30

EXCAVATION, WET, CLASS 1, EARTH AND GRAVEL

Oregon-California: Klamath	Dec. 15, 1910	172	Lost River diversion works	Cubic yard	2,500	$1.00	$1.50	$1.50
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam	do	4,500	1.91	2.00	(1)

EXCAVATION, CLASS 2, INDURATED MATERIAL

Idaho: Boise	July 8, 1910	165	Widening Main South Side Canal	Cubic yard	172,000	$0.60	$0.70	$0.60
New Mexico: Rio Grande	Aug. 8, 1910	166	Branch railroad	do	5,000	.40	.55	.40
Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division pipe trench	do	2,400	.80	.80	.80
Do	do	169	Prosser division diversion dam	do	75	1.50		(1)
Do	do	169	Prosser division distributing canal	do	2,000	.80	.80	.80
Oregon-California: Klamath	Nov. 30, 1910	170	Lost River diversion channel, schedule 2	do	900	.35	.60	.35
Do	do	170	Lost River diversion channel, schedule 3	do	1,500	.35	.60	.35
Do	do	170	Lost River diversion channel, schedule 4	do	1,500	.35	.60	.35
Do	Dec. 15, 1910	172	Lost River diversion works	do	2,300	.80	.99	.99
South Dakota: Belle Fourche	Feb. 24, 1911	173	North Canal, division 2, schedule 1	do	10,000	.05	.20	.45
Do	do	173	North Canal, division 2, schedule 2	do	8,000	.05	.18	.18
Do	do	173	North Canal, division 2, schedule 3	do	8,000	.05	.17	.17
Do	do	173	North Canal, division 2, schedule 4	do	10,000	.19	.20	.19
Do	do	173	North Canal, division 2, schedule 5	do	12,000	.05	.19	.19
Do	do	173	North Canal, division 2, schedule 6	do	2,000	.05	.22	.45
Do	do	173	North Canal, division 2, schedule 7	do	2,000	.20	.23	.45
Do	do	173	North Canal, division 2, schedule 8	do	4,000	.05	.19½	.45
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam	do	40,000	.45	.50	(1)
Do	do	177	Kachess Dam spillway	do	10,000	.30	.50	(1)
Idaho: Boise	June 1, 1911	182	Enlarging Main South Side Canal	do	2,000	.60	.75	.60

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EXCAVATION, WET, CLASS 2, ROCK

Oregon-California: Klamath	Dec. 15, 1910	172	Lost River diversion works	Cubic yard	500	$1.25	$1.83	$1.83
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam	do	500	2.50	3.00	(1)

EXCAVATION, CLASS 3, ROCK

Idaho: Boise	July 8, 1910	165	Widening Main South Side Canal	Cubic yard	40,000	$1.45	$1.50	$1.60
New Mexico: Rio Grande	Aug. 8, 1910	166	Branch railroad	do	50,000	.93	.95	.93
Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division trench excavation	do	2,340	1.50	2.25	1.50
Do	do	169	Prosser division diversion dam	do	30	2.50		(1)
Do	do	169	Prosser division distributing canal	do	1,000	1.50	1.60	1.50
Oregon-California: Klamath	Nov. 30, 1910	170	Lost River diversion channel, schedule 2	do	100	.50	1.20	.50
Do	do	170	Lost River diversion channel, schedule 3	do	200	.50	1.20	.50
Do	do	170	Lost River diversion channel, schedule 4	do	200	.50	1.20	.50
Do	Dec. 15, 1910	172	Lost River diversion works	do	500	1.00	1.83	1.83
South Dakota: Belle Fourche	Feb. 24, 1911	173	North Canal, division 2, schedule 1	do	1,000	.05	.20	.70
Do	do	173	North Canal, division 2, schedule 2	do	2,000	.05	.18	.18
Do	do	173	North Canal, division 2, schedule 3	do	1,000	.05	.16¾	.17
Do	do	173	North Canal, division 2, schedule 4	do	1,000	.05	.19	.19
Do	do	173	North Canal, division 2, schedule 5	do	1,000	.05	.19	.19
Do	do	173	North Canal, division 2, schedule 6	do	1,000	.05	.22	.70
Do	do	173	North Canal, division 2, schedule 7	do	1,000	.05	.23	.70
Do	do	173	North Canal, division 2, schedule 8	do	1,000	.05	.19¼	.70
Washington: Yakima (Storage)	Apr. 15, 1911	177	Kachess Dam outlet channel	do	5,000	.70	.80	(1)
Do	do	177	Kachess Dam trench	do	500	2.50	3.00	(1)
Do	do	177	do	do	5,000	.75	.80	(1)
Do	do	177	Kachess Dam spillway	do	2,000	.75	1.00	(1)
Idaho: Boise	June 1, 1911	182	Enlarging Main South Side Canal	do	9,300	1.65	1.75	1.65

FLUMES

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division No. 96, Maginnis steel in place	Linear foot	1,000	$2.75	$2.813	(1)
Do	do	169	Prosser division No. 72, Maginnis steel in place	do	600	2.10	2.55	(1)

GATES AND OPERATING GEAR, PLACING.

Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam. outlet	Number	4 sets.	$100.00	$150.00	(1)

[1] All bids rejected.

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Unit bids and contract prices—Continued

GRAVEL

State and project	Date	Specification No.	Feature or description	Unit	Quantity	Bids per unit		Contract price.
						Lowest	Next	
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam, under dry paving	Cubic yard	300	$0.50	$1.00	(1)
Do	do	177	Kachess Dam spillway, dry paving	do	850	.60	1.00	(1)

GRUBBING

Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam	Acre	20	$125.00	$130.00	(1)
Do	do	177	Kachess Dam spillway	do	5	130.00	150.00	(1)

LUMBER

New Mexico: Rio Grande	Aug. 8, 1910	166	Railroad bridges, framing and erection only	Feet	400,000	$13.50	$18.50	$13.50
Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division, bridge floor	do	14,000	30.00	40.00	30.00
Do	do	169	Prosser division, diversion dam	do	6,000	40.00		(1)
Do	do	169	Prosser division, trestle for flumes	do	29,000	40.00	47.35	(1)
Oregon-California: Klamath	Dec. 15, 1910	172	Lost River diversion works, pool floor	do	27,000	40.00	40.00	40.00
Do	do	172	Lost River diversion works, culverts	do	20,000	40.00	48.00	48.00
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam spillway	do	5,000	35.00	40.00	(1)
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike	do	(?)	45.00	50.00	55.00

OVERHAUL

Idaho: Boise	July 8, 1910	165	Widening Main South Side Canal	Cubic yard (100 feet).	100,000	$0.01	$0.02	$0.01
New Mexico: Rio Grande	Aug. 8, 1910	166	Branch railroad, schedule 1	do	6,000	.01	.02	.02
Do	do	166	Branch railroad, schedule 2	do	500	.01	.02	.02
Idaho: Boise	June 1, 1911	182	Widening Main South Side Canal	do	10,000	.02	.02	.02

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PAINTING

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division, stave pipe line	Square	54	$2.00	$2.60	$2.00
Do	do	169	Prosser division, bridge floor	do	110	2.00	2.60	2.00

PAVING

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division, diversion dam, grouted	Cubic yard	25	$6.00	.....	(1)
Do	do	169	Prosser division, diversion dam, dry	do	25	6.50	.....	(1)
Oregon-California: Klamath	Dec. 15, 1910	172	Lost River diversion works, schedule 1, dry	do	1,000	3.50	$4.06	$4.06
Do	do	179	Lost River diversion works, schedule 5, dry	do	100	4.00	7.20	7.20
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam, grouted	do	2,600	3.50	5.00	(1)
Do	do	177	Kachess Dam, dry	do	520	2.00	2.50	(1)
Do	do	177	Kachess Dam spillway, grouted	do	250	2.50	5.00	(1)
Do	do	177	Kachess Dam spillway, dry	do	1,700	2.00	2.50	(1)
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike, upstream slope, dry	do	12,100	2.99	3.25	2.99

PIPE, STEEL, AND INGOT IRON

Colorado: Uncompahgre Valley	Aug. 12, 1910	167	High Mesa Siphon, 26-inch diameter steel	Linear foot	3,808	$4.10	$4.80	(1)
Do	do	167	High Mesa Siphon, 26-inch diameter ingot iron	do	3,808	5.10	.....	$5.10
Do	do	167	Dry Creek Siphon, 36-inch diameter steel	do	1,416	5.48	5.65	5.48
Do	do	167	Dry Creek Siphon, 36-inch diameter ingot iron	do	1,416	6.82	.....	(1)

PUDDLING

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division, diversion dam	Cubic yard	40	$1.00	.....	(1)

RIPRAP

Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam	Cubic yard	10,000	$1.75	$2.00	(1)

ROCK FILL

Washington: Yakima (Storage)	Apr. 15, 1911	177	Kachess Dam, drain at toe	Cubic yard	7,000	$1.40	$1.50	(1)
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike, berm	do	1,100	2.60	3.00	$3.95
Do	do	189	Indian Creek Dike, toe trench	do	2,700	2.40	2.65	2.65

[1] All bids rejected.

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Unit bids and contract prices—Continued.

SOIL DRESSING

State and project	Date	Specification No.	Feature or description	Unit	Quantity	Bids per unit		Contract price
						Lowest	Next	
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike, downstream slope	Acre	1.58	$490.00	$664.50	$490.00

STAVE PIPE

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division, 31-inch diameter	Linear foot	7,500	$0.80	$1.146	$1.19
Do	do	169	Prosser division, ¼-inch steel (bands and shoes)	Number	19,200	.414	.415	.415
Do	do	169	Prosser division, blow off (12-inch)	do	1	200.00	246.60	260.00

STEEL RAILS

Idaho: Boise	May 4, 1911	186	Arrowrock Railroad, No. 1 rails (60-lb.)	Ton	1,850	$25.00	$26.80	$25.00
Do	do	186	Arrowrock Railroad, No. 2 rails (60-lb.)	do	5 per cent.	23.80		23.80

STEEL, REENFORCING

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division, diversion dam	Pound	2,000	$0.02		(1)
Oregon-California: Klamath	Dec. 15, 1910	172	Lost River diversion works (handling)	do	200,000	.00½	$0.015	$0.015
Washington: Yakima (storage)	Apr. 15, 1911	177	Kachess Dam (placing)	do	300,000	.00½	.01½	(1)
Utah: Strawberry Valley	June 19, 1911	189	Indian Creek Dike (placing)	do	95,000	.01	.01½	.01½

STEEL, STRUCTURAL

Washington: Yakima (Sunnyside)	Nov. 1, 1910	169	Prosser division, diversion dam	Pound	800	$0.07		(1)
Oregon-California: Klamath	Dec. 15, 1910	172	Lost River diversion works, schedule 1 (handling)	do	50,000	.01	$0.015	$0.015
Do	do	172	Lost River diversion works, schedule 5 (handling)	do	25,000	.01	.024	.024
Washington: Yakima (Storage)	Apr. 15, 1911	177	Kachess Dam (placing)	do	37,000	.01	.02	(1)

STRIPPING

Washington: Yakima (Storage)	Apr. 15, 1911	177	Kachess Dam	Cubic yard	13,500	$0.40	$0.45	(1)

[1] All bids rejected.

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RECLAMATION ORGANIZATION

GENERAL OFFICERS

Hon. Walter Lowrie Fisher, Secretary of the Interior.
Brig. Gen. William L. Marshall, U. S. A., retired, consulting engineer to the Secretary of the Interior.
Frederick Haynes Newell, Director of the Reclamation Service, Washington, D. C.
Arthur Powell Davis, chief engineer, Washington, D. C.
Philip P. Wells, chief law officer, Washington, D. C.
Morris Bien, supervising engineer, in charge land and legal division, Washington, D. C.
O. H. Ensign, chief electrical engineer, 605 Federal Building, Los Angeles, Cal.
D. W. Murphy, engineer, in charge of Washington office engineering, Washington, D. C.
D. C. Henny, consulting engineer, 605 Spalding Building, Portland, Oreg.
A. J. Wiley, consulting engineer, Boise, Idaho.
W. H. Sanders, consulting engineer, 915 Grand View Avenue, Los Angeles, Cal.
J. H. Quinton, consulting engineer, 605 Wright and Callender Building, Los Angeles, Cal.
W. H. Code, chief engineer, Indian irrigation, consultation on Indian matters, 526 Federal Building, Los Angeles, Cal.
W. W. Follett, consulting engineer, International (Water) Boundary Commission, consultation on Rio Grande, El Paso, Tex.
S. W. Dick, transportation agent, 777 Federal Building, Chicago, Ill.
C. J. Blanchard, statistician, Washington, D. C.
E. C. Bebb, engineer, Washington, D. C.
J. Y. Jewett, cement expert, 408 Commonwealth Building, Denver, Colo.
E. G. Paul, chief clerk, Washington, D. C.
V. G. Croissant, accountant, Washington, D. C.
C. G. Duganne, fiscal agent, Washington, D. C.

SOUTHERN DIVISION

ARIZONA, NEW MEXICO, TEXAS, UTAH, CALIFORNIA

L. C. Hill, supervising engineer, Phoenix, Ariz.; C. S. Witbeck, examiner.
Salt River project.—C. H. Fitch, project engineer, Phoenix, Ariz.; Jay D. Stannard and W. A. Farish, engineers; H. S. Reed, engineer, operation and maintenance of canals; S. B. Taggart, chief clerk; C. B. Barnhard and H. E. Edington, fiscal agents.
Yuma project.—F. L. Sellew, project engineer, Yuma, Ariz.; L. M. Lawson, engineer; A. N. Kelley, chief clerk; F. S. Cundiff, fiscal agent.
New Mexico projects.—W. M. Reed, district engineer, El Paso, Tex.; P. W. Dent, assistant examiner; W. H. Frankland, chief clerk.
Carlsbad project.—L. E. Foster, assistant engineer, in charge of operation and maintenance, Carlsbad, N. Mex.
Hondo project.—C. A. May, junior clerk, in charge of operation and maintenance, Carlsbad, N. Mex.
Rio Grande project.—H. J. Gault, engineer, Elephant Butte, Sierra County, N. Mex.; Swan T. Olsen and Jay Brown, fiscal agents; J. A. French, engineer, El Paso, Tex.
Leasburg unit.—Earl Patterson, junior engineer, in charge of operation and maintenance, Selden, Dona Ana County, N. Mex.
Strawberry Valley project.—J. L. Lytel, project engineer, Provo, Utah; A. J. Hughes, chief clerk; J. L. Segall, fiscal agent.

PACIFIC DIVISION

CALIFORNIA, OREGON, NEVADA

E. G. Hopson, supervising engineer, 501 Beck Building, Portland, Oreg.; O. P. Morton and E. S. Taylor, examiners.
Orland project.—A. N. Burch, irrigation manager; C. H. Lillingston, chief clerk; J. W. Spencer, fiscal agent.
Truckee-Carson project.—D. W. Cole, project engineer, Fallon, Nev.; L. W. Hall, engineer; H. W. Marean, superintendent of irrigation; J. H. Post, chief clerk; F. G. Hough, fiscal agent.

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Lahontan dam.—F. H. Tillinghast, assistant engineer, Hazen, Nev.; R. B. Keese, superintendent of construction.

Umatilla project.—H. D. Newell, project engineer, Hermiston, Oreg.; J. M. Griffin, superintendent of irrigation; C. W. Kellogg, chief clerk and fiscal agent.

Klamath project.—W. W. Patch, project engineer, Klamath Falls, Oreg.; Wm. Sargent, engineer; C. C. Hogue, chief clerk and fiscal agent; W. H. Heileman, engineer, operation and maintenance.

NORTHERN DIVISION

MONTANA, NORTH DAKOTA, WYOMING

H. N. Savage, supervising engineer, Helena, Mont.; R. O. Hayt, engineer; W. J. Egleston, examiner.

Blackfeet project.—R. M. Snell, project engineer, Seville, Mont.; C. E. Frisbee, chief clerk; H. W. Bruen, fiscal agent.

Flathead project.—E. F. Tabor, project engineer, St. Ignatius, Mont.; C. W. Donnally chief clerk; W. H. Meglesson and R. M. Reid, fiscal agents.

Huntley project.—C. D. Howe, acting project engineer, Huntley, Mont.; E. B. Leclaire, chief clerk and fiscal agent.

Fort Peck project.—Ralph M. Conner, project engineer, Poplar, Mont.; Frank Nivens, chief clerk and fiscal agent.

Milk River project.—G. O. Sanford, project engineer, Malta, Mont.; E. G. Lee, chief clerk; Wm. T. Parker, fiscal agent.

St. Mary Storage unit.—Joseph Wright, engineer, Babb, Mont.

Sun River project.—Judson B. Bond, project engineer, Fort Shaw, Mont.; G. W. Brown, fiscal agent.

Missouri River pumping project.—R. H. Fifield, acting project engineer, Williston, N. Dak.; W. S. Arthur, chief clerk and fiscal agent.

Lower Yellowstone project.—Lester H. Mitchell, acting project engineer, Glendive, Mont.; F. J. Israel, chief clerk and fiscal agent.

Shoshone project.—C. P. Williams, project engineer, Powell, Wyo.; E. E. Sands and George E. Stratton, engineers; C. M. Jump, superintendent of irrigation; C. A. Peavy, chief clerk; T. W. Hause, fiscal agent.

Shoshone dam.—V. W. Russell, assistant engineer, Cody, Wyo.

CENTRAL DIVISION

COLORADO, KANSAS, OKLAHOMA, SOUTH DAKOTA, NEBRASKA, WYOMING

R. F. Walter, supervising engineer, 519 Commonwealth Building, Denver, Colo.; A. R. Honnold, examiner; J. A. Dolphin, chief clerk and fiscal agent.

Grand Valley project.—J. H. Miner, project engineer, Grand Junction, Colo.

Uncompahgre Valley project.—C. T. Pease, project engineer, Montrose, Colo.; J. R. Alexander, examiner; J. M. Luney, chief clerk; E. R. Furstenfeld, fiscal agent.

North Platte project.—Andrew Weiss, project engineer, Mitchell, Nebr.; Fred D. Pyle, irrigation manager; O. P. Burrows, chief clerk; Mike T. Murray, fiscal agent.

Pathfinder dam.—H. D. Comstock, assistant engineer, Pathfinder, Wyo.; J. R. Ummel, fiscal agent.

Belle Fourche project.—F. C. Magruder, project engineer, Belle Fourche, S. Dak.; E. R. Mills, chief clerk; T. E. Jones, fiscal agent; O. T. Reedy, engineer, Orman, S. Dak.

IDAHO DIVISION

IDAHO, OREGON, WYOMING

F. E. Weymouth, supervising engineer, Boise, Idaho; B. E. Stoutemeyer, examiner; F. L. Cavis, chief clerk; R. R. Clawson, fiscal agent.

Boise project.—F. W. Hanna, project engineer, Boise, Idaho; G. H. Bliss, engineer, operation and maintenance.

Boise River storage unit.—C. H. Paul, engineer, Boise, Idaho; James Munn, superintendent of construction.

Minidoka project.—P. M. Fogg, project engineer, Rupert, Idaho; C. A. Lyman, chief clerk; N. K. Jensen, fiscal agent.

Snake River storage unit.—F. T. Crowe, engineer, Moran, Wyo.; E. H. Prescott, fiscal agent.

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WASHINGTON DIVISION

WASHINGTON

C. H. Swigart, supervising engineer, North Yakima, Wash.; A. H. Gullickson, chief clerk; E. W. Burr and N. K. Buck, assistant examiners.

Okanogan project.—Ferdinand Bonstedt, project engineer, Okanogan, Wash.; H. A. Yates, chief clerk and fiscal agent.

Yakima project.—C. H. Swigart supervising engineer, North Yakima, Wash.; T. E. Brick, assistant chief clerk; J. C. Gawler, fiscal agent.

Storage unit.—E. H. Baldwin, project engineer, Easton, Wash.; C. E. Hamilton, chief clerk and fiscal agent.

Sunnyside unit.—Ernest McCulloh, project engineer, Sunnyside, Wash.; Ernest A. Moritz, engineer; R. K. Tiffany, superintendent of irrigation; J. J. Buck, chief clerk; E. M. Philebaum, fiscal agent.

Tieton unit.—C. E. Crownover, project engineer Naches, Wash.; O. R. Smith, superintendent of irrigation; G. E. Ross, chief clerk.

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DISCUSSION OF PROJECTS

[A brief statement of the origin of each project and of the preliminary investigations made, and a concise description of the construction work completed prior to July 1, 1910, may be found in the ninth annual report.]

ARIZONA, SALT RIVER PROJECT [1]

LOCATION AND CLIMATIC CONDITIONS

Counties: Maricopa and Gila.

Townships: 3 S. to 3 N., Rs. 1 to 6 E. and 3 to 5 N., Rs. 11 to 14 E., Gila and Salt River meridian.

Railroads: Santa Fe, Prescott & Phoenix; Arizona Eastern.

Railroad stations: Phoenix, Tempe, Mesa, Glendale, and Peoria, Ariz.

Average elevation of irrigable area: 1,200 feet above sea level.

Average annual rainfall on irrigable area: 8 inches.

Range of temperature on irrigable area: 22° to 117°.

WATER SUPPLY

Source of water supply: Salt and Verde Rivers, and wells in various parts of the valley. On Gila Indian Reservation, wells, and flood flow of Gila River.

Area of drainage basins: Salt River, 6,250 square miles; Verde River, 6,000 square miles.

Annual run-off in acre-feet: Salt River at Roosevelt (5,760 square miles), 1888 to 1907—maximum, 3,260,000; minimum, 154,000; mean, 804,000. Verde River at McDowell (5,760 square miles), 1888 to 1908—maximum, 1,850,000; minimum, 117,000; mean, 586,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoir: Roosevelt—area, 16,320 acres; capacity, 1,284,000 acre-feet; length of spillway, 400 feet; elevation of spillway, 220 feet above stream bed.

Storage dam: Roosevelt—type, rubble masonry arch gravity; maximum height, 280 feet; length of crest, 1,170 feet; volume, 342,000 cubic yards.

Diversion dams: Granite reef—type, rubble concrete weir; maximum height, 38 feet; length of masonry, 1,000 feet; volume, 40,000 cubic yards. Power canal—type, rubble concrete weir; maximum height, 12¾ feet; length of masonry, 400 feet; volume, 8,000 cubic yards.

Length of canals now in use: 32 miles with capacities greater than 800 second-feet; 64 miles with capacities from 301 to 800 second-feet; 92 miles with capacities from 50 to 300 second-feet; 366 miles with capacities less than 50 second-feet.

Tunnels: Number, 23; aggregate length, 10,980 feet.

Dikes: Aggregate length, 1,000 feet.

Wells, present development: Mesa district, 7 batteries; Gila Indian Reservation, 10 single wells; San Francisco, 1 battery.

Water power: Present development, 4,500 horsepower from power canal; estimated total on completion, 18,650 horsepower, developed at the following points: 9,000 horsepower from power canal and Roosevelt Reservoir at Roosevelt Power Plant; 2,800 horsepower at South-Consolidated Power Plant; 1,450 horsepower at Arizona Falls Power Plant; 5,400 horsepower at Cross-Cut Power Plant.

Irrigable area: Total, 240,000 acres. Main project, about 230,000 acres (gravity system, 190,000 acres; pumping system, 40,000 acres); Gila Indian Reservation, 10,000 acres.

Present status of irrigable land (entire project): 16,000 acres entered subject to the reclamation act; 14,080 acres of State lands; 200,000 acres in private ownership; 10,000 acres Indian lands.

[1] Includes description of work on Gila Indian Reservation lands, about 10,000 acres.

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RESULTS TO JUNE 30, 1911

Canals: 32 miles with capacities of more than 800 second-feet; 64 miles with capacities from 301 to 800 second-feet; 92 miles with capacities from 50 to 300 second-feet; 366 miles with capacities less than 50 second-feet.

Tunnels: Number, 23; total length, 10,980 feet.

Storage dams: Number, 1; volume, 342,000 cubic yards of masonry.

Diversion dams: Number, 2; volume, 48,000 cubic yards of concrete.

Dikes or levees for protection from overflow: Total length, 1,000 feet; volume, 42,700 cubic yards.

Wells: Mesa district, 2 batteries; Gila Indian Reservation, 5 batteries.

Canal structures: 74 costing more than $2,000 each; 102 costing from $500 to $2,000 each; 580 costing less than $500 each.

Bridges: Combination, 17 less than 50 feet in length—total length, 765 feet; wood, 61 less than 50 feet in length—total length, 1,353 feet; concrete, 4 less than 50 feet in length—total length, 190 feet.

Buildings: Offices, 1; residences, 12; barns and storehouses, 7; power house, 1; transformer house, 1; switching and substations, 4; pump houses, 7.

Roads: 147 miles.

Telephone lines: 145 miles; telephones in use, 48.

Transmission lines: 123 miles (main line, Roosevelt to Phoenix, 65 miles).

Material excavated: Class 1, earth, 2,477,000 cubic yards; class 2, indurated material, 1,000,000 cubic yards; class 3, rock, 524,000 cubic yards.

Riprap: 7,000 cubic yards.

Paving: 1,600 square yards.

Cement used: 401,175 barrels; 338,452 barrels were manufactured by the United States.

Concrete placed: 331,600 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 170,000 acres.

Area irrigated, season of 1911: 150,661 acres.

Length of the two irrigating seasons: 365 days—summer, June 1 to September 30; winter, October 1 to May 31.

Character of soil of irrigable area: Sandy loam, with clay in places.

Principal products: Semitropical fruits, cereals, alfalfa.

Principal markets: Phoenix and other Arizona towns, Pacific coast cities, and eastern markets.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. All lands are being irrigated under rental contracts.)

CHRONOLOGICAL SUMMARY

Reconnaissance made and preliminary surveys begun in 1902.

Construction authorized by Secretary, March 14, 1903.

Cement mill completed and machinery installed March, 1905.

Temporary hydroelectric power plant installation completed March, 1906; three power units with aggregate capacity of 4,500 horsepower installed in permanent power plant in 1909.

Grand, Water-Power, Salt River Valley, Maricopa, and Joint-Head Canals purchased June 15, 1906.

Sand-crushing plant completed August, 1906.

Power canal completed October, 1906.

Irrigation by the Reclamation Service began May 15, 1907.

Granite Reef Dam completed August, 1908.

Appropriators Canal acquired January 19, 1909.

Transmission line, Roosevelt to Phoenix, completed May, 1909.

South Canal completed June, 1909.

Consolidated Canal purchased July 10, 1909.

Permanent hydroelectric plant put in operation August, 1909.

Eastern Canal completed December, 1909.

Service of electric energy to Gila River Indian Reservation for construction purposes began March, 1910.

Operation of cement mill ceased August 1, 1910.

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Roosevelt Dam completed February 5, 1911.
Formal dedication of Roosevelt Dam, March 18, 1911.
Entire project 92 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Salt River project provides for the storage of water in a reservoir controlled by Roosevelt Dam on Salt River at Roosevelt, Ariz., about 78 miles northeast of Phoenix; the diversion of water from Salt River by the Granite Reef Dam, about 4 miles below the mouth of the Verde River, into the old Arizona Canal on the north side of the river and into the South Canal on the south side of the river; the enlargement of the Arizona Canal; and the consolidation of the canal systems in Salt River Valley in the vicinity of Phoenix and Mesa into two systems, receiving water from the Arizona and South Canals. A power plant at the storage dam generates power from stored water in the reservoir and from water delivered from the power canal heading at a diversion dam in Salt River, about 19 miles above the storage dam. Other power plants will be established on Salt River below Roosevelt and at drops in canals. A part of the power developed will be used for pumping water for extending the irrigated area, and a part will be sold for industrial purposes.

Of the features comprising this plan there have been completed: The power canal with its diversion dam; Roosevelt Dam; Granite Reef Diversion Dam; three units of Roosevelt power plant; the transmission line to Phoenix and the Gila River Indian Reservation, together with necessary switching and substations; the South Canal, which feeds the south side system; the Eastern Canal; two batteries of wells with caissons for pumping equipment in the Mesa district and 5 single wells in the Gila River Indian Reservation. Work is rapidly progressing on the enlargement of the Arizona Canal, the construction of lateral systems under the Arizona and Grand Canals, and the general distributing system on the south side of the river.. Well drilling and installation of pumping equipment in the Mesa district, well drilling at the head of the San Francisco Canal, construction of secondary transmission lines, and preparations for installing additional units at the Roosevelt power plant are also in progress. Future construction consists chiefly of work to be done by the water users' association, viz, the Salt Lateral, Crosscut Canal, extension of Grand Canal, the Arizona Falls power plant, Crosscut power plant, South-Consolidated power plant, and transmission lines.

Plans for the Gila River Indian Reservation work include a main canal to divert flood waters from the Gila River at a point about 3½ miles east of Sacaton into a 10,000 acre distribution system on the north side of the river; a system of 10 wells with caissons and electric pumping equipment to supplement this intermittent flood supply; a system of wells on the south side of the river in the vicinity of Casa Blanca, necessary transmission lines and subpower stations to operate these wells and the Agency pumping plant with electric power from the Roosevelt power house; and the possible utilization of the bed of the Little Gila River as a diversion canal. Of the features included in this plan there have been completed the flood-water canal, 13 miles of laterals, 5 wells with complete pumping equipment on the north side of the river, and the transmission line to these wells. Additional laterals and the remaining five wells on the

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north side of the river, the transmission line across the river, and the pumping plant at the agency are under construction. Surveys and investigations are being made for future development on the south side of the river.

CONSTRUCTION DURING FISCAL YEAR

Roosevelt Dam.—On August 1, 1910, the cement mill was closed, enough cement having been manufactured to complete the dam. All contract work on the dam was completed February 5, 1911, and the auxiliary structures, consisting of gate and tool houses and the lighting system, were completed by Government forces in time for the dedication ceremonies, which were held on March 18, 1911.

Roosevelt Power Plant.—The 10-foot penstock leading from the reservoir was extended into the plant and the 10-foot emergency valve was installed; one 6-foot and two 5-foot valves were placed in position ready for connecting with the three additional power units which are to be installed later; two 43-inch discharge valves were placed in position; No. 2 exciter unit was put in operation; and a large amount of electrical work was done in connection with the plant.

Pumping plants and power transmission.—In the Mesa district one battery of wells was completed and placed in operation; equipment was installed in the Clemmons well, and the remaining five batteries were brought to various degrees of completion; a substation was built in Phoenix, and lines were constructed to supply power consumers.

Canal system.—Enlargement of the Arizona Canal was continued throughout the year with both dredge and excavator, and a total of 505,565 cubic yards of material was excavated, a portion of which required blasting. Ten laterals with concrete turnouts were constructed under the Arizona Canal, and excavation and concrete structure work was in progress on laterals under the Grand Canal. On the south side of the river, 2 miles of feeder canal and 19 miles of laterals have been constructed, and 8 miles of laterals have been enlarged, necessitating the moving of about 190,000 cubic yards of material. The necessary concrete turnouts, drops, etc., have also been constructed.

Gila River Indian Reservation.—The main flood water canal, having a capacity of 300 second-feet, was practically completed prior to June 30, 1910. During the fiscal year 12.92 miles of canals and laterals with appurtenant structures were constructed, the total amount constructed to June 30, 1911, being 18.86 miles. The number of operating wells was increased to five and caissons were sunk and pumping equipment was partly installed in five others. Work was begun on the transmission line across the Gila River to the Agency.

OPERATION AND MAINTENANCE

The irrigation works operated during the season of 1910 included the Roosevelt Reservior, all of the present canal systems on the north side of the river, and the South, Mesa, Eastern, and Consolidated Canals, and the Eureka Ditch on the south side of the river. Water was supplied to the canals on the north side of the river through the headworks of the Arizona Canal at Granite Reef Dam, and to the

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canals on the south side of the river through the headworks of the South Canal at Granite Reef Dam. The total area irrigated and cultivated under the canals operated by the Reclamation Service amounted to about 106,000 acres. About 25,000 acres more were supplied with water by the Utah, Tempe, and San Francisco Canals on the south side of the river, these canals being operated by their respective organizations, independently of the Reclamation Service. During the present season 150,661 acres are being irrigated, an increase over the previous year of 18,915 acres. Of this total about 30,000 acres are served by canals not belonging to the Reclamation Service. To accomplish the irrigation of this amount of land there was diverted from the water supply during the year ending June 30, 1911, 689,250 acre-feet, of which 402,775 acre-feet was actually applied to the land. On June 30, 1910, at elevation 102.04, the amount of stored water was 116,000 acre-feet, while on June 30, 1911, at elevation 156.60, the amount was 463,742 acre-feet, showing an increase of 347,242 acre-feet at the end of the period when the maximum demands are made, this being the months of March, April, May, and June.

All of the canals acquired by the Reclamation Service were in an exceedingly poor condition at the time of purchase, and much work has been done in improving their condition for efficient operation and in rehabilitating and unifying the irrigation systems. The work of installing concrete structures in place of the wooden ones which were previously in use on all the canal systems has progressed very well, but much remains to be done. Some additions have been made to the canal systems, the total lengths of canals and laterals operated by the Reclamation Service on June 30, 1911, being 534 miles, as compared with 491 miles on June 30, 1910. Of the above 534 miles, 360 miles are on the north side of the river, and 174 miles on the south side. The water supply furnished by the gravity system has been augmented by placing in operation two of the batteries of wells that were installed south of the town of Mesa. One of these batteries, formed by five 15-inch drilled wells, furnishes a constant supply of 10.5 second-feet, and the other, with three 16-inch wells, furnishes 6 second-feet. The wells in each group are attached to a common suction and operated by a single pumping station. Work is progressing satisfactorily on the equipment of the other wells, and it is expected that all will be in operation before the close of the year 1911. Notwithstanding that the year 1910 was one of low run-off in Salt River, by the aid of water stored in Roosevelt Reservoir, it was possible during the season to furnish an adequate supply of water at all times for the lands ready for irrigation and to supply water for the irrigation of considerable land that would otherwise not have been entitled to water. The water was furnished the water users under rental contracts at the rate of $0.60 per acre for the summer season, from June 1 to September 30, and $1 per acre for the winter season, from October 1 to May 31.

SETTLEMENT AND IRRIGATION

Excellent progress, on the whole, has been made along all agricultural lines during the past year, and a general feeling of optimism prevails throughout the project. Irrigation on the project is carried

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on during the whole year, there being two seasons, a summer season from June 1 to September 30, devoted to the cultivation of alfalfa, garden truck, small fruits and sugar beets, and to dairying; and a winter season, from October 1 to May 31, devoted mainly to the cultivation of alfalfa, grain, and citrus fruits, and to dairying. Of the acreage in cultivation, 54.7 per cent is in alfalfa, 38.4 per cent is in grain, 8 per cent is in pasture for dairying purposes, and the remaining 8.1 per cent is distributed over a wide range of products, including fruits, sugar beets, and vegetables. On a large part of the land under cultivation during the season of 1910 there would have been a serious loss of crops had stored water not been available.

On the Gila Indian Reservation the five wells in operation have supplied all the water required to augment the river flow for the irrigation of crops on the north side of the river. About 10,000 acres of land are under ditch, of which 4,500 acres were cultivated the present season.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Salt River project

No.	Date	Contractor	Description	Estimated value	Estimated earnings, June 30, 1911	Completion due
35	Apr. 8, 1905	J. M. O'Rourke & Co	Roosevelt Dam	$1,197,600.00	$1,666,112.06	.....
85	Jan. 15, 1906	S. Morgan Smith Co.	Water wheels	19,165.00	[1] 22,689.03	Sept. 10, 1908
300	Nov. 5, 1909	Byron Jackson Iron Works.	Centrifugal pumps	7,588.88	10,788.83	May 26, 1910
315	Feb. 9, 1910	S. Morgan Smith Co.	Water wheel	1,740.00	[1] 1,405.00	June 22, 1910
358	Mar. 22, 1911	Byron Jackson Iron Works.	Centrifugal pumps	7,845.00	.....	July 13, 1911
359	Mar. 21, 1911	Wagner Electric Manufacturing Co.	Electrical apparatus.	7,778.18	.....	June 25, 1911
362	Apr. 6, 1911	S. Morgan Smith Co.	Water wheels	18,100.00	.....	Dec. 17, 1911
365	Apr. 3, 1911	Westinghouse Electric & Manufacturing Co.	Switchboard	1,411.00	.....	May 31, 1911

[1] Completed.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Salt River project

ASSETS

Accounts receivable:		
Uncollected water rentals	$17,550.49	
Uncollected miscellaneous rentals	26.95	
Uncollected miscellaneous	23,181.46	
		$40,758.90
Inventories:		
Government animals	8,761.42	
Equipment in use	48,805.16	
Storehouse	127,526.89	
Cement	16,352.66	
Explosives	171.78	
Cash in office safe	11.80	
Freight and handling undistributed	20,898.18	
		222,527.89

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Cost of work:			
Building cost		$9,878,521.47	
Less adjustments	$17,682.67		
Accrued revenues	639,239.27		
		656,921.94	
			$9,221,599.53
Total assets			9,484,886.32

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$9,970,429.67		
Transfer vouchers received	257,968.74		
		$10,228,398.41	
Collection vouchers	1,021,492.65		
Transfer vouchers issued	42,468.20		
		1,063,960.85	
			$9,164,437.56
Accounts payable:			
Unpaid labor		36,561.20	
Unpaid purchases		15,412.48	
Unpaid contract estimates		76,157.59	
Unpaid contract holdbacks		1,720.00	
Unpaid freight and express		24,909.64	
Unpaid passenger fares		227.85	
Unpaid land agreements		65,109.00	
Unpaid miscellaneous		351.00	
			220,448.76
Repayments accrued: Building			100,000.00
Total liabilities			9,484,886.32

Feature costs to June 30, 1911, Salt River project

Storage works:		
Roosevelt Dam	$3,077,693.21	
Sluicing tunnel	125,410.04	
Hydraulic gates	250,049.79	
Reservoir, clearing site, moving camps, etc	13,629.24	
Outlet tunnel	55,581.26	
Approach to east end of dam	13,530.55	
Overflow weir (below Roosevelt Dam)	8,922.97	
Lands submerged by reservoir	152,414.04	
		$3,697,231.10
Power system:		
Diversion dam, Livingston	115,633.00	
Power Canal, construction	1,253,208.24	
Penstock tunnel (from Power Canal)	65,242.17	
Auxiliary penstock (from Power Canal)	8,319.69	
Dam penstock (through Roosevelt Dam)	99,452.86	
Hydroelectric power plant No. 1 (Roosevelt)	329,473.43	
Hydroelectric power plant No. 2 (South-Consolidated)	2,121.88	
Hydroelectric power plant No. 3 (New Cross-Cut)	105.69	
Hydroelectric power plant No. 4 (Arizona Falls)	342.73	
Hydroelectric power plant No. 5 (Tempe Cross-Cut)	233.15	
Transformer house (Roosevelt Dam)	114,754.43	
Switching station plant	37,007.92	
Substation No. 1 plant (8 miles south of Mesa)	29,786.10	
Substation Phoenix plant	11,826.71	
Transmission line, 45,000 volt (Roosevelt-Phoenix)	338,533.02	
Transmission lines, 10,000 volt	34,163.64	
Transmission line to south consolidated power plant	203.34	
Operation power plant No. 1	72,500.35	
		2,512,908.35

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Granite Reef Diversion Dam:		
Borings	$6,589.25	
Diversion dam	577,592.34	
Arizona Canal heading	30,854.76	
Park	7,747.69	
		$622,784.04
North side canal system:		
Arizona Canal (includes purchase price)	841,021.50	
Grand Canal (includes purchase price)	330,933.23	
Maricopa Canal (includes purchase price)	94,877.71	
Salt River Valley Canal (includes purchase price)	92,456.55	
Power Canal (includes purchase price)	15,729.99	
New Cross-Cut Canal	917.81	
Appropriators Canal, miscellaneous expense (acquired by Government)	383.22	
		1,376,320.01
South side canal system:		
South Canal	154,808.42	
Eastern Canal (includes purchase price)	198,505.77	
Consolidated Canal (includes purchase price)	288,799.21	
Mesa Canal	62,507.62	
Tempe Canal	578.90	
Eureka Canal (purchase price)	9,269.00	
San Francisco Canal (purchase price)	12,840.00	
Western Canal	26,475.66	
		753,784.58
Irrigable lands:		
Farm units	8,151.01	
Utah Canal	288.68	
		8,439.69
Well drilling:		
Mesa district	77,178.88	
San Francisco wells	6,765.07	
		83,943.95
Plant accounts:		
Miscellaneous plant and buildings	475,100.09	
Less depreciation	428,600.30	
		46,499.79
Real estate (rights and property): Land purchased (not submerged)		18,778.90
Telephone system: Construction		67,492.41
Roads, construction and maintenance:		
Roosevelt-Phoenix	$408,856.49	
High line	93,857.03	
Tonto	78,864.63	
Miscellaneous	18,608.99	
		600,187.14
Work done for Indian Service: Reimbursable		2,058.12
Examination of project as a whole:		
Agua Fria cement investigations	833.50	
Underground water supply	16,201.64	
Surveys	42,230.38	
Investigation, Phoenix Valley	6,225.98	
Hydrography	12,639.66	
General reconnoissance	835.85	
Verde reconnoissance	4,024.97	
Water analysis	2,274.87	
		85,266.85
Inventory of cost ledger supplies		2,826.54
Total building cost, as per debit in cost of work in statement of assets and liabilities		9,878,521.47

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ARIZONA-CALIFORNIA, COLORADO RIVER PROJECTS

IRRIGATION PLAN

The Colorado River projects consist of a number of possible irrigable developments on the lower Colorado River in Arizona and California, the principal of which are the Blythe-Parker and Needles projects. The irrigation plan of these projects provides in general for the diversion of water from Colorado River for irrigation of lands near the river; the diversion for the Blythe-Parker project being made at Headgate Rock, near Parker, Ariz., about 120 miles above Yuma, and the diversion for the Needles project being made a few miles north of Mohave City, Ariz., and about 200 miles above Yuma. The normal low-water supply of Colorado River is insufficient for present satisfactory irrigation of these projects, and their success therefore will depend on the storage of water in the drainage areas of the Grand and Green River systems, forming the Colorado River.

INVESTIGATIONS

In 1903 topographic surveys were made of the lands along the Colorado River from the Mexican border to about 100 miles north of Needles. Beginning in 1904 and continuing intermittently to the present time, preliminary examinations and surveys of reservoir sites on the Grand and Green River systems have been made as follows: The Kremmling, Windy Gap, and Lehman, on the Grand River; the Grand Lake, at the head of the North Fork of Grand River; the Flaming Gorge, Island Park, and Browns Park, on Green River; and two sites on Yampa River, a tributary of Green River. Diamond-drill and wash borings at the proposed dam site for Browns Park Reservoir were begun in the summer of 1907, and continued through the seasons of 1908 and 1909.

No investigations have been made during the fiscal year ending June 30, 1911, except stream gaugings.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Colorado River projects

ASSETS

Cost of work: Building cost	$43,659.73

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$42,185.70		
Transfer vouchers received	7,159.61		
		$49,345.31	
Collection vouchers	760.32		
Transfer vouchers issued	4,925.26		
		5,685.58	
			43,659.73

Feature costs to June 30, 1911, Colorado River projects

Preliminary examination and surveys	43,659.75

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ARIZONA-CALIFORNIA, YUMA PROJECT[1]

LOCATION AND CLIMATIC CONDITIONS

Counties: Yuma, Ariz.; Imperial, Cal.
Townships: 3 to 13 S., Rs. 21 to 25 W., Gila and Salt River meridian; 9 to 17 S., Rs. 16 to 23 E., San Bernardino meridian.
Railroad: Southern Pacific.
Railroad stations: Yuma, Ariz., and Potholes, Cal.
Elevation of irrigable area: 100 to 300 feet above sea level.
Average annual rainfall on irrigable area: 2½ inches.
Range of temperature on irrigable area: 22° to 118°.

WATER SUPPLY

Source of water supply: Colorado River.
Area of drainage basin, 229,000 square miles above Laguna Dam.
Annual run-off in acre-feet of Colorado River at Yuma (287,000 square miles) 1902 to 1910: Maximum, 25,900,000; minimum, 7,960,000; mean, 16,400,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Diversion dam: Laguna—type, Indian weir; maximum height, 40 feet in main channel, 19 feet outside of main channel; length of masonry, 4,780 feet; volume of masonry, 66,714 cubic yards; rock fill, 375,018 cubic yards; area flooded, 6,400 acres.
Length of canals: 15 miles with capacities greater than 800 second-feet; 17 miles with capacities from 301 to 800 second-feet; 110 miles with capacities 50 to 300 second-feet; 260 miles with capacities less than 50 second-feet.
Tunnels: Concrete lined siphon under Colorado River, length 1,000 feet, internal diameter 14 feet.
Dikes: Aggregate length, 388,080 feet.
Water power: Estimated total, 1,000 horsepower at drop in main canal.
Irrigable area: 131,000 acres.
Present status of irrigable lands: 30,000 acres entered subject to the reclamation act, 44,000 acres withdrawn from entry, 57,000 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 4 miles with capacities of more than 800 second-feet; 19 miles with capacities of from 50 to 300 second-feet; 85 miles with capacities less than 50 second-feet.
Diversion dams: Volume, 66,714 cubic yards of masonry; 375,018 cubic yards of rock fill.
Dikes: Total length, 272,870 feet; volume, 2,784,344 cubic yards.
Canal structures: 2 costing over $2,000 each; 14 costing from $500 to $2,000 each; 402 costing less than $500 each.
Bridges: Wood—1 with a length of 50 feet or more; 13 less than 50 feet; total length, 506 feet. Concrete—1 with a length of 50 feet or more; 13 less than 50 feet; total length, 333 feet.
Buildings: Office, 1; residence, 1; barns and storehouses, 5; pump houses, 3.
Roads: 23 miles.
Telephone lines: 101 miles. Telephones in use: 46.
Material excavated: Class 1, earth, 3,884,713 cubic yards; class 2, indurated material, 352,785 cubic yards; class 3, rock, 685,594 cubic yards.
Riprap: 53,187 cubic yards.
Paving: 80,491 square yards.
Cement used: 82,186 barrels.
Concrete placed: 83,400 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 16,000 acres.
Area irrigated, season of 1911: 10,050 acres.
Length of the two irrigating seasons: 365 days.

[1] Includes 7,672 acres of Indian lands in the Yuma Indian Reservation.

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Character of soil of irrigable area: Bottom lands, rich alluvian; Mesa lands, Fresno gravelly sand.
Principal products: Semitropical fruits, alfalfa, grain.
Principal markets: Los Angeles and San Francisco, Cal.; Arizona towns; eastern markets for early produce.

LANDS OPENED FOR IRRIGATION

Date of public notice: January 12, 1910.
Location of lands opened: Townships 15 and 16 S., R. 25 E., San Bernardino Meridian.
Present status of irrigable lands opened: 6,503 acres entered subject to the reclamation act and the act of April 21, 1904.
Limit of area of farm units: Public, 40 acres.
Duty of water: 5 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $55.
Annual operation and maintenance charge: $1 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance made and preliminary surveys begun in 1902.
Construction authorized by Secretary May 10, 1904.
Canal system of Colorado Valley Pumping & Irrigating Co. purchased March 15, 1907.
First irrigation by Reclamation Service, season of 1907.
Canal system of Yuma Valley Union Land & Water Co. (Farmers' Gravity Canal) purchased February 3, 1908.
Rollins Ditch (including Ives heading pumps and ditches) purchased July 23, 1908.
Laguna Dam completed March, 1909.
Whole project 52.5 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Yuma project provides for the diversion of water from Colorado River at the Laguna Dam, 10 miles northeast of Yuma, Ariz., into two canal systems, one heading on the California side of the river, conveying water to irrigable lands on that side of Colorado River, including those in the Yuma Indian Reservation, crossing Colorado River at Yuma by an inverted siphon and serving the irrigable lands in the Colorado River valley below Yuma; and the other heading on the Arizona side of Colorado River watering lands in the Colorado and Gila River Valleys lying east of Colorado River and north of Gila River. The plan also provides for a large pumping plant 1 mile below Yuma on the main Yuma Canal, for raising water to irrigate 40,000 acres of mesa land, and for a small pumping plant at the terminus of the gravity canal on the Arizona side of the river below Laguna Dam for raising water through a small lift to irrigate 6,000 acres. The lands adjacent to the Gila and Colorado Rivers are protected from overflow of these streams by means of dikes. The Laguna Dam, 44 miles of canals and laterals for the irrigation of lands on the Yuma Indian Reservation, 4½ miles of the main canal between Laguna Dam and the Colorado River Siphon, and about 70 per cent of the entire levee construction for the project is now completed. Work is in progress on the Colorado River Siphon, the main canal on the California side, and portions of the levee system. Construction of the canal system below Yuma, including the rebuilding and consolidation of the existing canals which have been acquired by purchase, will be undertaken upon completion of the Colorado River Siphon. The pumping system for the bench lands south of Yuma and the canal system for the lands in Arizona below the Gila River remain for future construction.

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CONSTRUCTION DURING FISCAL YEAR

Laguna Dam.—Construction work on this feature was practically finished in March, 1909. Since that time a small force has been employed in protecting the river bank on the California side from erosion and in overhauling machinery and equipment. During the year ending June 30, 1911, 7,000 cubic yards of riprap were placed along the river front, and the placing of concrete paving on a small portion of the dam was completed.

Colorado River Siphon.—Preliminary work on this feature was commenced in November, 1909. The plans provide for concrete shafts 140 feet deep on either side of the river, connected by a circular concrete-lined tunnel of 14 feet inside diameter and about 1,000 feet long. This tunnel is to be driven through sandstone rock about 50 feet below the river bed. During the year the shafts were completed to grade by the open-caisson method, and an attempt was made to drive the tunnel also with open headings, but, due to the porous character of the material encountered, water came in so rapidly that it was found necessary to resort to the compressed-air method. In April, 1911, arrangements were made to install a compressed-air plant for driving the tunnel. On June 30 this machinery was in place and ready for use, and it is expected that work on the siphon will be completed in January, 1912.

Canals.—A 3-mile section of the main canal between Laguna Dam and the Colorado Siphon was completed during the year, 297,600 cubic yards of earth being excavated. This section extends from the location of the proposed power house to the intake of the siphon. A total of 450 animals were employed in the construction of this feature during April, May, and June. Work was in progress on lateral canals in the Indian Reservation for several weeks previous to the latter part of June, at which time the camps were disbanded for the summer.

Levees.—In the spring of 1911 a large force was employed on the construction of a 5½-mile section of the levee on the Arizona side of the Colorado River below Laguna Dam. This work, which involved the placing of 319,100 cubic yards of material, was completed in June. The levee which protects the lower Yuma Valley was completed to the Mexican boundary line early in 1911.

OPERATION AND MAINTENANCE

During the fiscal year ending June 30, 1911, there were approximately 10,000 acres under cultivation on the Yuma project. Of this total 2,050 acres were situated in the first unit opened for settlement on the Indian Reservation, and the remaining 8,000 acres were supplied with water on a rental basis by the temporary pumping systems in the Yuma Valley. Water for the lands on the Indian Reservation is supplied by gravity from Laguna Dam through a permanent system which is now well primed and is operating satisfactorily. This unit contains a total of 6,500 acres of irrigable land, but due to the short length of time since these lands were opened to entry only one-third was ready for cultivation. The remainder, however, is being cleared for planting and it is expected that during the coming year the total area will be under cultivation. Approximately 13,000 acre-feet of water were furnished during the year to 172 farm units. The rotation system is used and water is delivered

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for irrigating purposes every eight days. Maintenance expense on this unit is small. Repair work is largely eliminated by the permanent character of the structures, and the provisions made for removing sediment at the regulator gates of the Laguna Dam have overcome the silt problem. In the unit opened there are 9 miles of canal with capacities between 50 and 300 second-feet, and 35 miles with capacities less than 50 second-feet. Twenty-five miles of permanent telephone lines have been erected and are operated in connection with the water service. In the lower Yuma Valley the temporary pumping plants known as the farmers' pump, the scoop wheel, and the Rollins pump, have furnished during the year 36,700 acre-feet of water to about 275 water users for the irrigation of 8,000 acres of land. The irrigation of the widely scattered areas under this system is being carried on with a 15-day service that produces good yields of hay and corn. Repairs to the canals and structures in the Yuma Valley have been of a temporary nature for the purpose of keeping expenses as low as possible pending the time when final location of canals can be made and when water can be delivered through the Colorado River Siphon from the Main Canal heading at the Laguna Dam. The maintenance of these canals has been expensive on account of the great amount of silt carried by the pumped water. At one time during the summer of 1910 the silt carried in the river was equal to 4 per cent, by weight, of the flow. This heavy turbidity silted the canals to such an extent that ditch cleaning was necessary three months earlier than usual. The canals of these systems in the Yuma Valley include 9 miles with capacities ranging from 70 to 100 second-feet, and 38 miles with capacities less than 50 second-feet. Twenty-five miles of telephone line are maintained in connection with the water service.

SETTLEMENT AND IRRIGATION

All of the 173 farm units opened for settlement in March, 1910, are occupied with one exception, and the area under cultivation was increased during the year from 600 acres to more than 2,000 acres. The farms all produce well and the improvements are of a substantial nature. Before the completion of the Colorado River Siphon no great extensions of irrigated area are being attempted because of the limited capacity of the pumping plants at Yuma. The principal crop grown on the Yuma project is alfalfa. Valley land, well watered and farmed, produces 8 to 10 tons per acre per year of alfalfa, which, when baled, sells at an average price of $12 per ton. The best returns per acre are obtained when two of the year's cuttings are sacrificed to permit the seed to mature. From 400 to 900 pounds of seed, selling at 14 cents per pound, are produced from one acre in one seed crop. On many farms two crops of seed have been procured from the same land during a season. Next to alfalfa the most productive crops are barley and corn, both crops being raised on the same land during the year. The first crops on the Indian Reservation units have been very successful. In Yuma Valley under the pumping systems approximately 4,000 acres are in alfalfa and during the past winter 2,000 acres were planted to barley. It is estimated that between $150,000 and $200,000 worth of alfalfa seed will be harvested during the summer of 1911.

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PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal current contracts, Yuma project

No.	Date	Contractor	Description	Estimated value	Estimated earnings, June 30, 1911	Completion due
226	Mar. 11, 1908	General Electric Co...	Generators.....	$1,783.00	[1] $1,689.00	July 3, 1908
241	June 8, 1908	Northern Electrical Manufacturing Co.	Gate-controlling apparatus.	5,785.75	[1] 5,785.75	Nov. 27, 1908
367	May 10, 1911	Chas. A. Haskin.....	Air compressor.....	.....	2,160.00	.....

[1] Completed.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Yuma project

ASSETS

Accounts receivable:			
Uncollected water rentals		$4,821.25	
Uncollected miscellaneous		2,670.50	
Uncollected water right building charges		31,144.03	
Uncollected water right operation and maintenance charges		523.00	
			$39,158.78
Inventories:			
Mercantile store		596.38	
Government animals		13,456.00	
Equipment in use	$184,235.33		
Less depreciation	8,028.30		
		176,207.03	
Storehouse		78,736.14	
Cement		11,064.45	
Iron and steel		2,348.15	
Lumber		5,555.32	
Forage		3,315.58	
Fuel		2,990.68	
Cash in office safe		335.30	
Freight and handling undistributed		650.33	
			295,255.36
Cost of work:			
Building cost		4,314,303.67	
Less adjustments	80,994.27		
Less accrued revenues	120,976.19		
		201,970.46	
			4,112,333.21
Operation and maintenance cost		32,683.46	
Less accrued revenues		240.00	
			32,443.46
Total assets			4,479,190.81

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$4,441,523.18		
Transfer vouchers received	125,749.78		
		4,567,272.96	
Collection vouchers	242,639.88		
Transfer vouchers issued	10,764.87		
		253,404.75	
			4,313,868.21

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Accounts payable:		
Unpaid labor	$31,216.07	
Unpaid purchases	23,012.66	
Unpaid contract estimates	2,220.00	
Unpaid freight and express	21,196.15	
Unpaid passenger fares	277.35	
Unredeemed coupon books	382.25	
Unredeemed meal tickets	823.60	
Unpaid miscellaneous	1,655.50	
		$80,783.58
Repayments accrued:		
Building	71,533.02	
Operation and maintenance	13,006.00	
		84,539.02
Total liabilities		4,479,190.81

Feature costs to June 30, 1911, Yuma project

Laguna Dam:		
Excavation, class 1	$638,807.49	
Excavation, class 2	134,143.42	
Rock in dam	208,059.81	
Concrete core walls	177,905.03	
Rock paving	9,175.53	
Concrete paving	246,619.60	
Sheet piling, upper wall	39,095.12	
Sheeting for lower wall	3,434.90	
Clearing above dam	177.76	
Cofferdam	90,816.66	
River front protection	31,021.19	
Rock training dike	5,355.85	
Flood expense	57,087.89	
Diking and ditching at toes of dam	17,555.89	
Preliminary and suspense expense	5,537.77	
Clearing face of dam and razing cofferdam	7,374.29	
Repairs and maintenance	662.20	
		$1,672,830.40
Sluice and regulator works:		
Sluiceway excavation	519.44	
Sluiceway piers and abutments	52,878.58	
Sluice and regulator gates, machinery, and installation	77,068.62	
Sluiceway walls and lining	82,216.73	
Sluiceway paving	22,623.05	
Concrete bridge over sluiceway	10,124.76	
Canal heading walls and lining	25,865.30	
Sluiceway excavation	26,387.52	
Power house	17,806.44	
Sluiceway protection and repairs	35,772.88	
Sluice gates (protection and repairs)	157.02	
		351,420.34
Canals:		
Reservation canal construction, excavation, structures, and bridges	298,469.20	
Arizona Main Canal	62,722.89	
Yuma Main Canal	195,329.97	
Colorado River Siphon at Yuma	266,513.99	
		823,036.05
Levees:		
Gila Valley	168,683.99	
Yuma Valley	301,320.25	
Reservation	263,324.69	
		733,328.93
Pumping plants with canal system:		
Steam pumping plant (farmers' pump) and canal	85,733.10	
Gravity plant (scoop wheel) and canal	111,831.24	
Pumping plant (Rollins pump) No. 3 and canal	32,316.59	
		229,880.93

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Examination of project as a whole:		
Preliminary surveys previous to selection of project.	$171,616.32	
Subdivision of reservation	30,106.75	
		$201,723.07
Real estate (rights and property): Lands purchased		77,121.52
Administration of project as a whole:		
General expense prior to Oct. 1, 1907	99,226.90	
General expense since Oct. 1, 1907	124,560.92	
Expense of convention	266.30	
		224,054.12
Inventory of building cost ledger supplies		908.31
Total building cost		4,314,303.67
Operation and maintenance:		
Diversion works	3,181.91	
Sluice and regulator works	17,243.04	
Reservation	12,258.51	
		32,683.46
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		4,346,987.13

CALIFORNIA, ORLAND PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Glenn and Tehama.

Townships: 21 to 23 N., Rs. 2 to 4 W., Mount Diablo meridian.

Railroads and other transportation lines: Southern Pacific Railroad and river steamers on Sacramento River.

Railroad stations: Orland, Greenwood, and Malton, Cal.

Average elevation of irrigable area: 225 feet above sea level.

Average annual rainfall on irrigable area: 17 inches.

Range of temperature on irrigable area: 26° to 120°.

WATER SUPPLY

Source of water supply: Stony Creek.

Area of drainage basin: Above diversion dam, 735 square miles; above East Park Dam, 102 square miles.

Annual run-off in acre-feet: Stony Creek near Fruto (760 square miles), 1901 to 1910. Maximum, 940,000; minimum, 308,000; mean, 564,000. Little Stony Creek at East Park Dam, 1907 to 1910: Mean 77,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoir: East Park—Area, 1,800 acres; capacity, 45,600 acre-feet; length of spillway, 415 feet; elevation of spillway, 85 feet above stream bed.

Storage dam: East Park—Type, concrete gravity section, arch plan; maximum height, 139 feet; length of crest, 250 feet; volume, 12,200 cubic yards.

Diversion dam: Type, sheet piling capped with concrete; length, 900 feet.

Length of canals: No canals with capacities greater than 300 second-feet; 23 miles with capacities from 300 to 50 second-feet; 70 miles with capacities less than 50 second-feet.

Dikes: Aggregate length, 625 feet.

Water power: None developed; estimated total, 600 horsepower.

Irrigable area: 14,200 acres.

Present status of irrigable lands: A small tract remains open to entry subject to the reclamation act. All the remainder is in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 23 miles with capacities 50 to 300 second-feet; 70 miles with capacities less than 50 second-feet.

Storage dams: Volume, 12,200 cubic yards.

Dikes: Length, 625 feet; volume 4,000 cubic yards.

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Canal structures: 3 costing over $2,000 each; 10 costing from $500 to $2,000 each; 1,032 costing less than $500 each.
Bridges: Number, 164; total length, 1,108 feet.
Buildings: Office, 1; residences, 2; barns and storehouses, 4.
Telephone lines: 50 miles, rented. Telephones in use: 7, rented.
Material excavated: Class 1, earth, 348,388 cubic yards; class 2, indurated material, 38,424 cubic yards; class 3, rock, 2,600 cubic yards.
Riprap: 1,200 cubic yards.
Cement used: 18,591 barrels.
Concrete placed: 17,350 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 14,000 acres.
Area irrigated, season of 1911: 2,600 acres.
Length of irrigating season: From May 1 to September 30—153 days.
Character of soil of irrigable area: Sandy and gravelly loam, silt loam.
Principal products: Alfalfa, citrus and other fruits, and vegetables.
Principal markets: San Francisco, Cal.; Portland, Oreg.; eastern market.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. All lands are being irrigated under rental contracts.)

CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys made in 1906.
Construction authorized by Secretary December 18, 1906.
Miller Buttes concrete headworks for South Canal completed November, 1908.
Canal system of Stony Creek Irrigation Co. purchased May 21, 1909.
Lemon Home Canal purchased March 26, 1910.
East Park Dam completed July 31, 1910.
First irrigation by Reclamation Service, season of 1910.
Construction of south side lateral system and high-line canal completed April, 1911.
Whole project 81 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Orland project provides for the storage of water in a reservoir controlled by East Park Dam on Little Stony Creek, at a point about 40 miles southwest of Orland, Cal., and the diversion of water from Stony Creek at Miller Buttes, 9½ miles northeast of Orland, into two canal systems, one on either side of the creek, for the irrigation of lands in the vicinity of Orland. The South Canal system is to irrigate 8,000 acres, and the north canal 6,000 acres and in each a purchased canal system is incorporated. The plan also includes a high-line canal, from which power is to be developed for the irrigation of 3,000 acres by pumping ground water from depths of from 30 to 40 feet. The storage works as originally designed are completed. It has been found necessary, however, to construct a concrete apron or tail race below the spillway to prevent destructive erosion and undermining of the structure. This apron will be constructed during the present season. The rebuilding of the Stony Creek Canal and the construction of the High-Line Canal and the distribution system on the south side have been completed. Work to be undertaken in the near future includes the construction of permanent diversion works for the north or Lemon Home Canal, the replacing of wooden structures on the North Canal, protection of the South Canal from the floods of Hambright Creek, and the lining of a portion of the High-Line Canal and of Lateral No. 40 with concrete.

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The present limits of the Orland project may be considered as a unit of the Sacramento Valley project. It may be extended by constructing additional reservoirs on Stony Creek and its tributaries. The chief additional reservoir sites available are Millsite, on Stony Creek, near Fruto; Briscoe, on Briscoe Creek, near Elk Creek; Stonyford, on Stony Creek, at Stonyford; and Stony Gorge, on Stony Creek, near Elk Creek.

CONSTRUCTION DURING FISCAL YEAR

The excavation of the High-Line Canal and the unconstructed portion of the south side distribution system was completed in April, 1911, under contracts which were let in September, 1910. The appurtenant structures, including 1 steel flume, 1 by-pass chute, 2 bridges, 4 culverts, 3 spillways, and 610 minor structures, were constructed by force account, concrete being used in all but the flume and bridges. A concrete siphon was built on the South Canal at the crossing of Hambright Creek and 5,986 linear feet of 12 to 24 inch concrete pipe was manufactured for use on the project.

OPERATION AND MAINTENANCE

The irrigation works operated during the season of 1910 comprised the South Canal system, taking water at Miller Butte heading, and the North Canal system, taking water at the old Lemon Home Canal heading. Lands served with water were, for the most part, those formerly irrigated under the old Stony Creek and Lemon Home Canal systems, and the water was daily distributed through the old laterals, which had been cleaned and repaired. No stored water was available for the irrigation season of 1910 and the canals were supplied with flood water from Stony Creek under rental contracts, at an average charge per acre of $2.10. There was an irrigation season of 84 days, from April 19, when the first water was used for irrigation, to July 12, when the flood of the creek became insufficient to supply an irrigating head. About 4,880 acre-feet of water were diverted from the creek during the period of service, and 2,400 acre-feet were delivered to 100 farms, for the irrigation of 703 acres of land. There was a heavy seepage loss, due to the fact that the rebuilt portion of the South Canal is located in coarse, gravelly soil, and did not become thoroughly silted during the short operating season. During the present season 60 miles of canals and laterals are in operation, and up to June 30, 14,000 acre-feet of water had been diverted into the canals, and 6,800 acre-feet of water had been delivered to a total of 210 farms for the irrigation of 2,551 acres. Water is being supplied on a rental basis for $2 per acre.

SETTLEMENT AND IRRIGATION

All of the land of the project is in private ownership and is being subdivided and sold in units not to exceed 40 acres each. One hundred and ten new farms have been put wholly or partly under cultivation during the year. The planting has been mainly to alfalfa, the percentage of commercial orchards and gardens being small. For the season of 1910 about 500 acres of alfalfa and about 200 acres of fruit were under irrigation, the total estimated value of the crops from which was $35,000.

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PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Orland project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1911	Completion due
257	Oct. 5,1908	Stanley Contracting Co.	East Park Dam.....	$79,881.65	[1]$88,553.59	July 31,1910
303	Oct. 29,1909	A. B. Munson.....	Excavation, distributing system.	26,500.00	[1] 28,327.69	Oct. 7,1910
339	Oct. 12,1910	Edwin Wade.....	High Line Canal.....	12,390.00	[1] 13,781.47	Apr. 14,1911
341	Nov. 9,1910	Hard Bros.....	Earthwork, distributing system.	10,738.20	11,007.42	Apr. 1,1911

[1] Completed.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Orland project

ASSETS

Inventories:			
Government animals		$540.00	
Equipment in use		7,247.74	
Storehouse		272.49	
Cement		1,015.69	
Iron and steel		900.09	
Lumber		465.90	
Forage		105.55	
Fuel		18.86	
Local products		465.32	
			$11,031.64
Cost of work:			
Building cost	$505,000.54		
Plus adjustments	6.51		
		505,007.05	
Less adjustments	73.96		
Less accrued revenues	13,576.62		
		13,650.58	
			491,356.47
Total assets			502,388.11

LIABILITIES

Investment of the United States:			
Disbursement vouchers	486,415.79		
Transfer vouchers received	28,866.99		
		515,282.78	
Collection voucher	12,586.56		
Transfer vouchers issued	3,691.69		
		16,278.25	
			499,004.53
Accounts payable:			
Unpaid labor		735.70	
Unpaid purchases		399.14	
Unpaid freight and express		524.24	
Unpaid passenger fares		74.50	
Unpaid land agreements		1,648.50	
Unredeemed coupon books		1.50	
			3,483.58
Total liabilities			502,388.11

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Feature costs to June 30, 1911, Orland project

Storage works:		
East Park reservoir lands	$73,373.28	
East Park Dam and dikes	165,373.90	
Stonyford reservoir examination	128.28	
Millsite reservoir examination	328.21	
		$239,203.67
Diversion system and headworks South Canal		17,865.83
Canal system (including purchase price):		
North Canal	22,368.07	
South Canal	48,822.60	
High Line Canal	18,832.36	
Stony Creek branch canal examination	55.47	
Middle Creek branch canal examination	2.50	
Orland branch canal examination	128.32	
Priming canals	50.97	
		90,260.29
Lateral system:		
Lateral excavation (north)	26,853.54	
Lateral excavation (south)	29,828.43	
Priming laterals	582.93	
		57,264.90
Structures:		
Pipe bridges	4,445.27	
Checks and drops, South Canal	3,716.05	
Spillways	1,156.22	
Special structures	2,832.56	
Checks and drops, lateral system	15,685.11	
Turnouts for farms	11,279.36	
Railroad crossings	6,633.70	
Deck bridges over 10-foot span	1,107.18	
Deck bridges under 10-foot span	2,940.23	
Turnouts for laterals	793.17	
Timber deck bridges, High Line Canal	149.43	
Pipe culverts, High Line Canal	1,021.55	
Flume, High Line Canal	3,311.01	
By-pass chute, High Line Canal	2,088.75	
Pipe lines, 12-inch	253.69	
Pipe lines, 18-inch	306.46	
Pipe culverts, 18-inch	1,274.18	
Highway concrete bridges	967.71	
Checks and drops, North Canal (preliminary)	.28	
Pipe culverts, 12-inch	99.03	
Pipe culverts, 24-inch	150.77	
Timber turnouts for farms	52.79	
Timber checks and drops	88.39	
		60,352.89
Buildings:		
Office	2,504.87	
Barn	481.64	
Wagon shed	92.25	
Storehouse	701.90	
Engineer's cottage	2,244.04	
Tankhouse	719.36	
Garage	106.01	
		6,850.07
Headquarters grounds, cultivation and maintenance		6,260.57
Administration of project as a whole, general expense		21,494.78
Operation and maintenance (during construction), distributing system		5,447.54
Total building cost as per debit in cost of work in statement of assets and liabilities		505,000.54

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COLORADO, GRAND VALLEY PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Mesa.
Townships: 1 N., Rs. 1 E. and 1 to 3 W.; 2 N., Rs. 2 and 3 W.; 1 S., Rs. 1 E. and 1 W., Ute meridian. 9 S., Rs. 101 to 104 W.; 10 S., Rs. 98, 101, and 103 W.; 11 S., Rs. 98 and 99 W., sixth principal meridian.
Railroads: Denver & Rio Grande; Colorado Midland.
Railroad stations: Palisade, Clifton, Grand Junction, Fruita, Loma, and Mack, Colo.
Average elevation of irrigable area: 4,700 feet above sea level.
Average annual rainfall on irrigable area: 8 inches.
Range of temperature on irrigable area: 15° F. to 100° F.

WATER SUPPLY

Source of water supply: Grand River.
Area of drainage basin: 8,550 square miles above Palisade.
Annual run-off in acre-feet of Grand River at Palisade, 1897 to 1899 and 1902 to 1910, maximum, 5,200,000; minimum, 2,300,000; mean, 3,670,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoirs: None contemplated.
Storage dams: None.
Diversion dam: Type, concrete foundations supporting movable steel wickets 10 feet in height; maximum height, 16 feet; length of movable crest, 200 feet, supplemented by 10 sluice-gate openings, each 15 feet in width; length of masonry, 465 feet; volume, 4,500 cubic yards.
Length of canals: With capacities greater than 800 second-feet, 6.2 miles; with capacities 301 to 800 second-feet, 36.8 miles; with capacities from 50 to 300 second-feet, 21 miles; capacities less than 50 second-feet, 5 miles.
Tunnels: Three; aggregate length, 12,283 feet.
Dikes: None.
Water power: 2,000 horsepower (estimated).
Irrigable area: 53,000 acres.
Present status of irrigable lands: 19,620 acres entered subject to the reclamation act, 10,450 acres withdrawn from entry, 22,930 acres in private ownership.

AGRICULTURAL CONDITIONS

Length of irrigation season: From April 1 to October 31, 214 days.
Character of soil of irrigable area: Sandy loam, sandy mesas, and adobe.
Principal products: Fruit, sugar beets, alfalfa.
Principal markets: Large cities east of Rocky Mountains for fruit; other products, local.

IRRIGATION PLAN

The irrigation plan of the Grand Valley project provides for the diversion of water from the Grand River by a dam about 8 miles northeast of Palisade, Colo., into a canal system on the north side of the river, for the irrigation of lands lying north and west of Grand Junction, Fruita, and Mack, Colo. About 43,500 acres will be supplied by gravity and 9,500 by pumping plants to be located along the main canal.

PROGRESS DURING FISCAL YEAR

No construction work has been undertaken, but preparations have been partially completed for beginning the construction of the longer tunnels by Government forces. Negotiations are still in progress with the Palisade and Mesa Irrigation District in an effort to reach an agreement whereby the districts shall transfer their water rights for

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power purposes to the project and secure irrigation water rights under the Government system. On May 31 the districts submitted a proposition to turn over their power water rights to the Government, to pay $20 per acre for a water right under the Government system, and to supply canal right of way throughout the districts free of charge to the United States, provided the supply canal for the project should be divided and be built on the locations of the present distribution canals of the districts. A postponement of further action until July 10, 1911, was granted by the department to give them an opportunity to show that they could carry out this agreement. Preliminary surveys for the proposed canal along the line of Price Ditch have been completed, and plats of the right of way required have been supplied to the Palisade Irrigation District.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Grand Valley project

ASSETS

Inventories:			
Government animals		$277.00	
Equipment in use		1,117.84	
Storehouse		2,644.25	
Lumber		3,285.90	
Forage		20.00	
			$7,344.99
Cost of work:			
Building cost	$76,716.79		
Plus adjustments	714.70		
		77,431.49	
			77,431.49
Total assets			84,776.48

LIABILITIES

Investment of the United States:			
Disbursement vouchers	78,522.64		
Transfer vouchers received	8,049.03		
		86,571.67	
Collection vouchers	35.69		
Transfer vouchers issued	2,852.27		
		2,887.96	
			83,683.71
Accounts payable:			
Unpaid labor		891.17	
Unpaid purchases		94.85	
Unpaid passenger fares		106.75	
			1,092.77
Total liabilities			84,776.48

Feature costs to June 30, 1911, Grand Valley project

Examination of project as a whole:		
Triangulation	$544.23	
Topography, general	7,348.27	
Surveys, right of way	2,021.36	
Surveys, construction	3,113.24	
Surveys, Grand Valley Canal area	479.35	
Surveys, Price Ditch	982.30	
Hydrography	2,096.74	
Estimating, designing, and locating	20,065.10	
		$36,650.59

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Administration of project as a whole, general expense	$39,253.19
Irrigable lands, farm-unit subdivision	813.01
Total building cost, as per debit in cost of work in statement of assets and liabilities	76,716.79

COLORADO, UNCOMPAHGRE VALLEY PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Montrose and Delta.

Townships: 15 S., Rs. 94 to 96 W., sixth principal meridian; 48 to 51 N., Rs. 7 to 12 W., New Mexico meridian.

Railroad: Denver & Rio Grande.

Railroad stations: Montrose, Olathe, and Delta, Colo.

Average elevation of irrigable area: 6,000 feet above sea level.

Average annual rainfall on irrigable area: 9 inches.

Range of temperature on irrigable area: −20° to 98°.

WATER SUPPLY

Sources of water supply: Gunnison and Uncompahgre Rivers.

Area of drainage basins: Gunnison River, 3,850 square miles; Uncompahgre River, 500 square miles.

Annual run-off in acre-feet: Gunnison River at River Portal (3,850 square miles) 1904 to 1910—maximum, 1,900,000; minimum, 840,000; mean, 1,450,000. Uncompahgre River at Fort Crawford (500 square miles) 1896 to 1899, 1903 to 1905, and 1908 to 1910—maximum, 260,000; minimum, 180,000; mean, 217,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoir: Taylor Park—Area, 2,260 acres; capacity, 106,000 acre-feet; length of spillway, 125 feet; elevation of spillway, 150 feet above stream bed.

Storage dam: Taylor Park—Type, arched masonry; maximum height, 200 feet; length of crest, 700 feet; volume, 212,000 cubic yards.

Diversion dams: One, crib and rock fill; four, type and design not determined.

Length of canals: 30 miles with capacities greater than 300 second-feet; 100 miles with capacities from 300 to 50 second-feet; 200 miles with capacities less than 50 second-feet.

Tunnels: Aggregate length, 35,000 feet.

Dikes: Aggregate length, 3,000 feet.

Water power: None developed; estimated total, 10,000 horsepower.

Irrigable area: 140,000 acres.

Present status of irrigable lands: 15,000 acres entered subject to the reclamation act, 19,000 acres withdrawn from entry, 106,000 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 12 miles with capacities more than 800 second-feet; 15 miles with capacities from 301 to 800 second-feet; 43 miles with capacities from 50 to 300 second-feet; 95 miles with capacities less than 50 second-feet.

Tunnels: Number, 6; total length, 33,314 feet.

Dikes or levees for protection from overflow: Total length, 550 feet; volume, 800 cubic yards.

Canal structures: Costing over $2,000 each, 25; costing from $500 to $2,000 each, 23; costing less than $500 each, 375.

Bridges: Number, 25; total length, 670 feet.

Buildings: Offices, 6; residences, 13; barns and storehouses, 14.

Roads: 21 miles.

Telephone lines: 33 miles. Telephones in use: 23.

Material excavated: Class 1, earth, 920,742 cubic yards; class 2, indurated material, 543,645 cubic yards; class 3, rock, 360,216 cubic yards.

Cement used: 65,395 barrels.

Concrete placed: 72,499 cubic yards.

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LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. All lands are being irrigated under rental contracts.)

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 30,000 acres.
Area irrigated, season of 1911: 24,000 acres.
Length of irrigating season: From April 1 to October 31—214 days.
Character of soil of irrigable area: Red sandy gravel, adobe, and clay loam.
Principal products: Alfalfa, grain, fruits, sugar beets, vegetables.
Principal markets: Denver, Colo.; Chicago, Ill.; local mining camps.

CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys begun in December, 1902.
Construction authorized by Secretary March 14, 1903.
South Canal completed May, 1908.
Montrose and Delta Canal purchased May 4, 1908.
Loutsenhizer Canal purchased September 25, 1908.
First irrigation by Reclamation Service, season of 1908.
Gunnison Tunnel completed for present use June, 1910.
Whole project 50.7 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Uncompahgre Valley project provides for the diversion of water from the canyon of Gunnison River by means of a tunnel about 6 miles long and a canal 11 miles long to supplement the flow of Uncompahgre River in the irrigation of lands in Uncompahgre Valley. To distribute the waters of the Uncompahgre and Gunnison Rivers, thus combined, the plan provides for the purchase, enlargement, and extension of the more important private ditches taking water from Uncompahgre River and for supplementing them by laterals diverting from the South Canal and by high-line canals, one on either side of the valley, taking water from Uncompahgre River.

The South Canal has been completed and the Gunnison Tunnel has been completed to the extent necessary for its present use. The Montrose and Delta canal system and the Loutsenhizer canal system have been purchased and partially enlarged and extended. The construction of a diversion dam in the Gunnison River and of laterals under the South Canal, and the further enlargement and extension of the Montrose and Delta and Loutsenhizer canal systems are in progress.

The owners of the Garnet and Reservation Ditches have made arrangements to transfer their irrigation works to the United States and negotiations have been initiated for the purchase of other canal systems. The enlargement of these irrigation works and the construction of the East and West Canals will be undertaken in the near future. The construction of storage works and the completion of the lining of the Gunnison Tunnel will be postponed to a later period.

CONSTRUCTION DURING FISCAL YEAR

Gunnison River Diversion Dam—The construction of the weir for the Gunnison River Diversion Dam was commenced in December, 1910, and continued until May, 1911, when the work was discon-

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tinued on account of high water. The weir is designed as a rock-fill crib structure divided into bays 6 feet square, with a crest 18 feet wide and 240 feet long and an apron 42 feet wide. On the east side of the river the dam is anchored to the rock cliff and on the west side it is tied to the sluiceway walls. The sluiceway adjoins the intake to the Gunnison Tunnel and contains two 6 by 8 foot cast-iron gates operated by a geared hand hoist. The sluiceway was nearly completed and 35 linear feet of the crib dam were constructed next to the cliff on the east side of the river before June 30, 1911.

Cedar Creek Wasteway—An overflow wasteway and waste channel, designed to carry the maximum flow of the Gunnison Tunnel, was built from the lower end of the west portal cut of the tunnel to Cedar Creek. In its construction 4,703 cubic yards of coarse gravel were excavated and 773 cubic yards of concrete placed.

A highway bridge and a girder bridge to carry the ballasted tracks of the Denver & Rio Grande Railway were built over the wasteway.

South Canal System—A regulating gate was installed at the entrance to the South Canal; and the floors of the three largest arch culverts under the canal were reenforced with steel rails and 8 inches of concrete. One hundred and sixty linear feet of the lined section of the South Canal were removed and replaced with reenforced concrete, and 1,640 linear feet of old lining were covered with a 4-inch face of reenforced concrete. Three laterals, ranging in capacity from 10 to 50 second-feet and aggregating 8.2 miles in length, together with five drops, one spillway, four taps, and five measuring weirs were constructed.

Montrose and Delta Canal System—The banks of the main canal were raised for a distance of 8 miles. The Franklin Mesa Lateral, with a capacity of 70 second-feet and a length of 2½ miles, was completed. A trench 3,806 feet in length was excavated for the siphon connecting the Franklin Mesa Lateral and the High Mesa Lateral, a 4-inch tile drain was laid in the bottom of the trench to carry seepage water, and preparations were made for constructing the siphon. The East Coal Creek Lateral was enlarged to double its former capacity for a distance of 3½ miles and the King Lateral was enlarged from a capacity of 50 second-feet to 125 second-feet, for a distance of 2½ miles. A concrete siphon, 4 by 4½ feet in cross section, was constructed across Pepper Draw. The excavation of the King Lateral extension with a capacity of 90 second-feet was completed in September, 1910, 12.3 miles being constructed during the fiscal year. On this lateral there are 21 galvanized-steel flumes with an aggregate length of 4,160 feet, supported by timber trestles resting on concrete piers. Sixteen of these flumes, aggregating 3,272 feet in length, and a 36-inch riveted steel-pipe siphon 1,416 feet long across Dry Creek have been constructed. Two miles of the Spring Creek Lateral, with a capacity of 20 second-feet, were completed. Timber headworks and a crib dam were constructed at the point of diversion from Coal Creek of the Montrose and Delta extension, and an embankment 550 feet in length was built to prevent sediment carried by the flood waters of the creek from being deposited in the canal.

Loutsenhizer Canal System—New timber headworks were constructed at the intake of the Loutsenhizer Canal and the dam across

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the Uncompahgre River was strengthened. The flow into the canal is regulated by six gates and the discharge through the sluiceway is controlled by two gates.

OPERATION AND MAINTENANCE

On July 6, 1910, the first water for irrigation was turned through the Gunnison Tunnel, an average of 200 second-feet being run during the remainder of the irrigation season. During the season of 1910 the Reclamation Service supplied water for the irrigation of 24,000 acres of land, 16,000 acres of which were supplied from the Montrose and Delta Canal, 6,500 acres from the Loutsenhizer Canal, and 1,500 acres from the South Canal through the Garnet and Reservation Ditches. During the season about 106,700 acre-feet of water were diverted into the canals operated by the service, about 70,000 acre-feet of this amount being delivered to the land for irrigation. The water was furnished on a rental basis, the charge being $80 per second-foot for the season. The failure of a culvert on the South Canal during 1910 necessitated the suspension of water service through that canal for a period of nine days. Deposits of gravel at the head of the Montrose and Delta Canal on three different occasions necessitated the shutting off of water in that canal for a total of 12 days. During the irrigation season the operating force was employed in regulating the distribution of water and making minor repairs, and during the remainder of the year the force was engaged in clearing the canals of vegetable growths and deposits of sand and in repairing and installing structures.

SETTLEMENT AND IRRIGATION

Some of the landholders have subdivided their holdings and many sales of small tracts to new settlers have been made. The crop statistics gathered for the season of 1910 showed the following areas in cultivation within the limits of the project: Alfalfa, 22,100 acres; oats, 3,075 acres; orchards, 5,650 acres; wheat, 1,425 acres; beets, 2,000 acres; potatoes, 2,950 acres; garden, 275 acres; corn, 125 acres. Of the area cultivated, 24,000 acres were furnished water from the Government canals, and 13,600 acres from the private ditches in the valley. On the land supplied with water from Gunnison River excellent crops were raised and for the first time in several years a third cutting of alfalfa was secured. Prices were good and the farmers as a whole were prosperous, though a partial failure of the fruit crop carried hardship to those who were dependent entirely upon that crop.

PRINCIPAL CURRENT CONTRACT

The following statement contains data relating to the principal contract in operation during the fiscal year ending June 30, 1911: No. 335; date, August 30, 1910; contractor, Riter-Conley Manufacturing Co.; for riveted pipe; estimated value, $27,180; estimated earnings, June 30, 1911, $27,543.12; completion due, March 26, 1911.

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Uncompahgre Valley project

ASSETS

Accounts receivable: Uncollected miscellaneous			$250.00
Inventories:			
Mercantile store		$1,993.22	
Government animals		7,336.10	
Equipment in use		3,836.34	
Storehouse		49,911.63	
Cement		15.147.71	
Lumber		15,936.30	
Explosives		2,096.92	
Forage		4,804.16	
Fuel		1,035.01	
Cash in office safe		56.50	
			102,153.89
Cost of work:			
Building cost	$4,576,682.45		
Plus adjustments	1,651.35		
		4,578,333.80	
Less adjustments	34,021.78		
Less accrued revenues	105,413.42		
		139,435.20	
			4,438,898.60
Total assets			4,541,302.49

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$4,602,902.76		
Transfer vouchers received	101,680.83		
		4,704,583.59	
Collection vouchers	185,310.80		
Transfer vouchers issued	9,575.16		
		194,885.96	
			4,509,697.63
Accounts payable:			
Unpaid labor		9,081.35	
Unpaid purchases		1,411.31	
Unpaid contract holdbacks		7,985.78	
Unpaid freight and express		12,450.22	
Unpaid passenger fares		249.50	
Unredeemed coupon books		426.70	
			31,604.86
Total liabilities			4,541,302.49

Feature costs to June 30, 1911, Uncompahgre project

Storage: Preliminary examination, Taylor Park Dam		$544.59
Cimarron lateral topography		1,319.11
Gunnison Tunnel:		
Headworks, head gates, excavation and concrete	$21,012.83	
Gunnison River Weir	47,705.89	
River portal heading	1,000,066.80	
West portal heading	1,643,655.37	
Portal cut excavating and lining	118,292.78	
Tunnel road	37,439.81	
Engineering	42,590.00	
Paid contractor	18,690.05	
		2,929,653.53

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Canal system:		
Purchase of existing canal systems (outstanding water rights and real estate)	$141,612.21	
General expense, preliminary operation	21,068.34	
South Canal	828,566.11	
Montrose and Delta Canal—		
Main line	137,486.82	
King Lateral	11,073.52	
King Lateral extension	99,755.52	
Dry Creek siphon	16,725.19	
East Coal Creek Lateral	7,158.32	
Franklin Mesa Lateral	4,137.04	
High Mesa Lateral	9,560.75	
Spring Creek Lateral	1,877.17	
Loutsenhizer Canal	23,227.95	
West Canal	16,360.45	
East Canal	9,752.04	
Cedar Valley Canal	7,198.78	
Selig Canal	1,774.50	
Garnet Canal	278.50	
Ironstone Canal	128.00	
		$1,337,741.21
Buildings, Montrose office		15,194.70
Telephone systems, construction		6,507.28
Preliminary topography, surveys		64,756.22
Irrigable lands, farm unit subdivision and soil examination		3,224.23
Examination of project as a whole:		
Expert engineering, hydrography, geology, lateral investigation, reconnoissance, etc		32,394.37
Administration of project as a whole:		
General expense	$145,126.44	
Montrose office	39,958.27	
		185,084.71
Power development surveys		262.50
Total building cost as per debit in cost of work in statement of assets and liabilities		4,576,682.45

IDAHO, BOISE PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Ada, Boise, Canyon, and Elmore.

Townships: 1 S. to 5 N., Rs. 6 W. to 6 E., Boise meridian, and Ts. 21 and 22 S., R. 46 E., Willamette meridian.

Railroads: Oregon Short Line; Boise, Nampa & Owyhee; Idaho Northern; Boise & Interurban; Boise Valley.

Railroad stations: Boise, Nampa, Caldwell, Meridian, and Kuna, Idaho.

Average elevation of irrigable area: 2,500 feet above sea level.

Average annual rainfall on irrigable area: 12.7 inches.

Range of temperature on irrigable area: −28° to 107°.

WATER SUPPLY

Source of water supply: Boise River.

Area of drainage basin: 2,610 square miles.

Annual run-off in acre-feet of Boise River near Highland (2,610 square miles), 1895 to 1910—maximum, 3,100,000; minimum, 1,200,000; mean, 2,260,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoirs: Deer Flat—Area, 9,250 acres; total capacity, 186,000 acre-feet; available capacity, 173,000 acre-feet; no spillway. Arrowrock—Area, 2,700 acres; total capacity, 237,500 acre-feet; available capacity, 230,000 acre-feet; length of spillway, 700 feet; elevation of spillway above stream bed, 260 feet.

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Storage dams: Upper Deer Flat—Type, earth fill; maximum height, 70 feet; length of crest, 4,000 feet; volume, 1,170,200 cubic yards. Lower Deer Flat—Type, earth fill; maximum height, 40 feet; length of crest, 7,200 feet; volume, 1,180,800 cubic yards. Deer Flat Forest—Type, earth fill; maximum height, 16 feet; length of crest, 950 feet; volume, 22,500 cubic yards. Arrowrock—Type, rubble concrete; maximum height, 351 feet; length of crest, 1,025 feet; volume, 520,000 cubic yards.

Diversion dam: Boise—Type, rubble concrete weir; maximum height, 45 feet; length of crest, including logway, 246 feet; volume, including canal headworks, 21,749 cubic yards.

Length of canals: 50 miles with capacities greater than 800 second-feet; 40 miles with capacities from 300 to 800 second-feet; 180 miles with capacities from 50 to 300 second-feet; 600 miles with capacities less than 50 second-feet.

Water power: 2,000 horsepower at Boise River Dam; horsepower at Arrowrock Dam not determined.

Irrigable area: 243,000 acres.

Present status of irrigable lands: 67,219 acres entered subject to the reclamation act; 22,720 acres of State lands; 152,569 acres in private ownership; 492 acres withdrawn from entry under first form withdrawal of the reclamation act and under the act of June 25, 1910.

RESULTS TO JUNE 30, 1911

Canals: 40 miles with capacities more than 800 second-feet; 50 miles with capacities from 301 to 800 second-feet; 105 miles with capacities from 50 to 300 second-feet; 385 miles with capacities less than 50 second-feet.

Storage dams: Volume, 2,190,500 cubic yards of earth.

Diversion dams: Volume, 21,749 cubic yards of masonry.

Canal structures: Costing over $2,000 each, 43; costing from $500 to $2,000 each, 44; costing less than $500 each, 5,725.

Bridges: 50 feet or more in length, 26; less than 50 feet in length, 526; total length, 8,535 feet.

Buildings: Offices, 9; residences, 5; barns and storehouses, 7.

Roads: 13 miles.

Telephone lines: 158 miles. Telephones in use, 75.

Material excavated: Class 1, earth, 6,898,450 cubic yards; class 2, indurated material, 967,150 cubic yards; class 3, rock, 209,260 cubic yards.

Riprap: 7,740 cubic yards.

Paving: 2,750 square yards.

Cement used: 69,390 barrels.

Concrete placed: 57,305 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 138,000 acres, including 18,000 acres of land in territory of New York Canal Co.

Area irrigated, season of 1911: 121,000 acres.

Length of irrigating season: From April 1 to October 31—214 days.

Character of soil of irrigable area: Clayey loam, light sandy loam, and sandy loam.

Principal products: Alfalfa, wheat, oats, potatoes, apples, prunes, and small fruits.

Principal markets: Boise, Nampa, Caldwell, and Meridian, Idaho; Portland, Oreg., and eastern cities.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. All lands are being irrigated under rental contracts.)

CHRONOLOGICAL SUMMARY

Reconnoissance made and preliminary surveys begun in 1902.

Construction authorized by Secretary March 27, 1905.

First irrigation by Reclamation Service, season of 1906.

Main canals of New York Canal Co. and Idaho-Iowa Lateral & Reservoir Co. acquired March 3, 1906.

Boise Dam completed September, 1908.

Lower Deer Flat Embankment, except gravel facing, completed January, 1908.

Lining Main South Side Canal completed November, 1910.

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Arrowrock Dam construction authorized January 6, 1911.
Upper Deer Flat Embankment completed March 24, 1911.
Deer Flat Forest Embankment completed June, 1911.
Project, exclusive of Boise River storage, 75 per cent completed June 30, 1911.
Project, inclusive of Boise River storage, 39 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Boise project provides for the storage of water in the Arrowrock Reservoir, on Boise River, about 20 miles above Boise, and in Deer Flat Reservoir, near Caldwell and Nampa, Idaho; the diversion of water from Boise River by the Boise River Dam, about 8 miles above Boise, the distribution of water on the south side of the river through the Main Canal leading from the diversion dam to theDeer Flat Reservoir, laterals heading in the Main Canal, distributing canals taking water from the Deer Flat Reservoir, and canal systems taking water from Boise River below the Boise River Dam; and the distribution of water on the north side of the river to a small area of land east of Boise through a canal system heading at the Boise River Dam. The Boise River Dam, the canal system on the north side of Boise River, and Deer Flat Reservoir are completed except for the gravel facing on the Lower Deer Flat Embankment. The Main Canal has been constructed throughout its entire length with a 40-foot bottom width, and 51,200 linear feet of it have been enlarged to a bottom width of 70 feet, and 30,700 linear feet of 40-foot bottom width have been concrete lined. The lateral system has been completed for 120,000 acres of new land and has been acquired in a completed condition for 79,000 acres of old land. Preliminary work on Arrowrock Reservoir, the enlargement of the remaining 42,400 linear feet of unlined main canal with 40-foot bottom width, the gravel facing of the Lower Deer Flat Embankment, and the construction of the lateral system for the remaining 44,000 acres of new land are in progress.

CONSTRUCTION DURING FISCAL YEAR

Arrowrock Reservoir.—Diamond-drill borings at the Arrowrock Dam site and a roadway from the Boise River Dam to Arrowrock have been completed and a sawmill has been installed and put in operation. The erection of camp buildings and the construction of a wagon road around the reservoir are in progress. The grading of the first 9 miles of the railroad from Barberton to Arrowrock is well under way, the grading for the remaining distance has been contracted for, and the laying of the track has been commenced. This railroad will be 17 miles long. Work has also been started on the diversion works at the Arrowrock Dam site and preliminary work has been done in the construction of the power plant at the Boise River Dam, from which power for construction purposes is to be obtained. The transmission line will have a length of 30 miles.

Boise River Dam.—For the purpose of preventing excessive seepage and of increasing the general factor of safety in the Boise River Dam, backfill was placed during the fall of 1910 on the upstream face of the dam to a level 7 feet below the crest of the spillway. This filling has a top width of 12 feet and an upstream slope of 3 to 1, and involved the placing of 2,150 cubic yards of earth and gravel and 140 cubic yards of riprap. To prevent the passing of logs over the spillway

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of the dam a heavy log boom, protected with angle irons against accidental or malicious breakage, was anchored to 4 large rockfill timber cribs and 1 concrete anchor pier, which were constructed in line above the dam at an angle of 60° with its crest. Work on the cribs and anchor pier was begun early in September and completed during November, 1910. Owing to the breaking of one of the sluice tunnel gates and the collapse of the tunnel trash rack, a new rack was installed at the tunnel entrance and a cofferdam was placed around the broken gate opening. In the construction of the boom and its anchorages, the trash rack, and tunnel gate cofferdam there were used 177,000 feet board measure of lumber, 2,915 cubic yards of rock, and 25,000 pounds of steel.

Main Canal.—Work has been continued on the enlargement of the Main Canal from a capacity of 1,500 second-feet to 2,500 second-feet, which is made necessary by the short period during which flood waters can be diverted through the canal to fill Deer Flat Reservoir. In order to obviate excessive seepage and breaks, as well as to avoid the cost of enlargement and the construction of checks, it was decided to place a 4-inch concrete lining in certain stretches of the canal of varying length between station 0 and station 412 and stations 924 and 953. Work by Government forces was begun in the fall of 1909 on this lining, and during the fall of 1910 the work was continued and completed for a total distance of 30,700 linear feet, approximately 21,000 linear feet of which were placed during the fall of 1910. The construction of this concrete lining involved the placing of 28,674 cubic yards of concrete, in which 31,700 barrels of cement were used. The enlargement of the unlined portions of the canal, between station 0 and station 412 to a bottom width of 70 feet was begun by force account in the fall of 1909 and completed during the fall of 1910. The total quantity of material excavated was approximately 120,500 cubic yards of class 1 material and 13,000 cubic yards of class 2 material. Half of this work was done in the fall of 1909 and the remainder in the fall of 1910. The enlargement of the unlined portions of the canal between stations 412 and 1225 is being done by contract, the greater part having been awarded in August, 1910, and the remainder in June, 1911. At the end of the fiscal year the contractors on the larger contract had excavated 192,000 cubic yards of class 1 material, 198,000 cubic yards of class 2, and 43,000 cubic yards of class 3 material, amounting in all to about 52 per cent of their contract. This work is to be completed by April 1, 1912. The remaining portion, comprising about 13,000 cubic yards of material, most of which is rock, is to be completed by December 15, 1911. Upon the fulfillment of these contracts the Main Canal will be completed.

Deer Flat Reservoir.—During the month of November, 1910, work was begun by force account on the facing of the Upper Deer Flat Embankment with gravel for wave protection. This work was continued when weather conditions permitted until March, 1911, during which month it was completed. The gravel was placed on the water face of the dam at two levels, one at the top of the dam and the other at a level 27 feet below the top of the dam. At the lower level 14,600 cubic yards of material were deposited and at the upper level 86,800 cubic yards. Early in April a road was finished from the Upper Deer Flat Embankment to the Lower Embankment by the way

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of the Forest Embankment site. The excavating equipment used at the Upper Embankment was moved to the site of the Forest Embankment and construction work on the latter was begun. This work consisted of the excavation of a cut-off trench and the construction of an earth embankment faced with 3 feet of gravel on top and on the downstream slope, and covered on the upstream slope with a large quantity of gravel dumped from the top of the dam. The construction of the cut-off trench involved the excavation and backfilling of 3,300 cubic yards of material; 12,000 cubic yards of earth were placed in the body of the dam, and the gravel facing amounted to 7,200 cubic yards. It was necessary to haul the gravel for this dam from the gravel pit at the Lower Embankment and the excavating equipment was transferred to that point. Upon completion of the Forest Embankment work was immediately started on a gravel facing for wave protection at the Lower Embankment, and there were placed at the close of the fiscal year approximately 17,000 cubic yards of material.

Distribution system.—The distribution system has been extended during the year to cover 30,000 additional acres of land, making a total of new lands ready for irrigation of 120,000 acres. This work involved the excavation of 919,000 cubic yards of material, the construction of 9,582 linear feet of steel flumes, 7,060 linear feet of timber flumes, 10,946 linear feet of concrete pipe, 4,325 linear feet of wood pipe, 16 concrete chutes and drops, 96 concrete turnouts, and 2,556 minor wooden structures, such as measuring weirs, tap boxes, drops, checks, bridges, and culverts. In the installation of these structures 1,718,000 feet board measure of lumber were used and 4,000 cubic yards of concrete were placed. Work has been started on the distribution system for about 15,000 acres additional land.

Telephone system.—A total of 61 miles of metallic circuit was added to the telephone system during the fiscal year, completing 158 miles of telephone line. Twenty-three miles of this line are equipped with double metallic circuit, 3 miles with triple metallic circuit, and 132 miles with single metallic circuit. About 30 miles more of single metallic circuit will complete the proposed telephone system for the project.

OPERATION AND MAINTENANCE

The right of the United States to divert water under its appropriation from Boise River during 1910 terminated July 10, on which date the flow of Boise River was 1,940 second-feet. After that date 219 second-feet were diverted under the priority appropriation of the New York Canal Co., for the use of its stockholders. This amount was further reduced to 110 second-feet on July 14, and water was then delivered for domestic uses by the rotation method until August 10, when diversion was discontinued by order of the court. Water was delivered from Deer Flat Reservoir until August 27.

The flood irrigation season of 1910 was comparatively short, due to light snowfall and a dry, hot spring. The maximum discharge of Boise River for the year was 18,800 second-feet and occurred on March 22, 1910, and the minimum was 650 second-feet and occurred on September 11, 1910. This is the lowest flow of Boise River on

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record, with the exception of that during the summer of 1905, when the minimum was 550 second-feet.

During the irrigation season of 1910, 340 miles of canals were operated and 232,181 acre-feet of water were diverted from Boise River for the irrigation of 33,377 acres of land in 986 farms. During the season of 1911, 1,315 farms, containing 60,000 acres of land, are being irrigated, involving the operation of 415 miles of canals and requiring an operating force of 60 employees. Prior to June 30, 279,000 acre-feet of water had been diverted and 78,771 acre-feet had been stored in Deer Flat Reservoir. All the reservoirs of the Idaho-Iowa Lateral & Reservoir Co. have also been filled according to contract, with the exception of the Hubbard Reservoir. During the season of 1910 the amount of water per acre delivered at the farm averaged 1.55 acre-feet for water users on Government land and 1.80 acre-feet for New York Canal stockholders. The season of 1911 will be longer and the amount of water delivered per acre will be considerably increased.

During the fall of 1910, in order to confine the large amount of water turned into Indian Creek from the main canal to fill the Deer Flat Reservoir, the creek channel was widened and straightened in several places and riprapped for considerable distances in others. The new channels have been operated satisfactorily during the season of 1911. The channels of Five Mile and Eight Mile Creeks were also improved during the fall of 1910 for use in supplying the Ridenbaugh Canal of the Nampa-Meridian Irrigation District in accordance with the contract between the United States and the district. Other maintenance work has been of a routine character, consisting mostly of the cleaning of canals and laterals, the repair of small breaks, and the installation and betterment of small structures.

SETTLEMENT AND IRRIGATION

Notwithstanding the short duration of the irrigation season of 1910, those who had seeded their crops early and had been careful in the preparation of their land and the construction of their ditches were, as a rule, well repaid for their labor. After the close of the season those who had not carefully prepared their land releveled and corrugated much of it that had given them trouble in irrigating, and in some isolated districts, where rabbits were destructive to crops, woven-wire fences were constructed. It is anticipated that flood water in Boise River will last until August 1 and that stored water from Deer Flat Reservoir will be available as long as needed, so that the crop prospects for the season are good.

Of the 60,000 acres of new land now under cultivation 37 per cent are in hay, 45 per cent in grain, 13 per cent in orchard, and 5 per cent in commercial crops of a miscellaneous nature. Nearly all of the public land of the project has been entered. The only opportunity for additional settlement lies in the sale of State land and in the subdivision of private land and of farm units after the residence requirements have been met. Two new town sites have been established on the project during the year, one on the Idaho Northern Railroad, 7 miles south of Nampa, and one 12 miles west of Caldwell, on a newly constructed railroad connecting Caldwell with Homedale.

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PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Boise project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1911	Completion due
103	May 19, 1906	Page & Brinton	Main canal, excavation.	$135,900.00	$244,111.13	Oct. 28, 1908
332	Aug 4, 1910	W. J. Hoy Construction Co.	Main south side canal.	194,200.00	123,290.35	Apr. 1, 1912
346	Jan. 5, 1911	Minneapolis Steel & Machinery Co.	Gates	2,072.00	[1] 2,072.00	Feb. 15, 1911
348	Dec. 23, 1910	Gilbert Hunt Co	Lateral head gates	2,824.00	[1] 2,824.00	Mar. 4, 1911
376	June 3, 1911	Illinois Steel Co	Steel rails	46,250.00	25,312.75	Oct. 21, 1911
381	May 25, 1911	Allis-Chalmers Co	Electrical apparatus	19,455.00		Dec. 2, 1911
382	do	Allis-Chalmers Co	Hydraulic turbines	17,310.00		Oct. 18, 1911
383	May 29, 1911	General Electric Co	Electrical apparatus	6,096.00		Sept. 28, 1911
384	June 9, 1911	Standard Underground Cable Co.	Copper wire	6,357.50	4,103.67	June 22, 1911
385	May 27, 1911	Maney Bros. & Co	Railway roadbed	27,910.00	15,931.00	July 24, 1911
387	June 15, 1911	H. K. Porter Co	Locomotive	10,140.00		July 22, 1911
391	May 22, 1911	Westinghouse Electric & Manufacturing Co.	Electrical apparatus	5,880.00		Aug. 20, 1911
392	June 22, 1911	Maney Bros. & Co	Main south side canal.	17,005.00		Dec. 15, 1911

[1] Completed.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Boise project

ASSETS

Accounts receivable: Uncollected water rentals			$793.45
Inventories:			
Mercantile store		$1,629.46	
Government animals		9,642.50	
Equipment in use	$92,795.57		
Less depreciation	4,785.92		
		88,009.65	
Storehouse		35,067.34	
Cement		4,769.09	
Iron and steel		9,445.63	
Lumber		22,250.81	
Explosives		2,310.10	
Forage		3,044.15	
Fuel		1,816.81	
Cash in office safe		587.43	
Local products		10,110.73	
Unadjusted transfers		327.04	
			189,010.74
Cost of work:			
Building cost		4,679,623.28	
Less adjustments	17,156.88		
Less accrued revenues	104,434.82		
		121,591.70	
			4,558,031.58
Total assets			4,747,835.77

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LIABILITIES

Investment of the United States:			
Disbursement vouchers	$4,499,981.38		
Transfer vouchers received	133,368.38		
		$4,633,349.76	
Collection vouchers	80,451.98		
Transfer vouchers issued	37,372.72		
		117,824.70	
			$4,515,525.06
Accounts payable:			
Unpaid labor		39,453.58	
Unpaid purchases		52,239.14	
Unpaid contract estimates		44,060.48	
Unpaid contract holdbacks		18,124.05	
Unpaid freight and express		17,491.29	
Unpaid passenger fares		569.15	
Unpaid land agreements		56,956.01	
Unredeemed coupon books		55.75	
Unredeemed meal tickets		2,645.00	
Unpaid miscellaneous		716.26	
			232,310.71
Total liabilities			4,747,835.77

Feature costs to June 30, 1911, Boise project

Administration of project as a whole		$212,455.54
Examination of project as a whole:		
Surveys	$36,283.34	
Hydrography	14,357.42	
		50,640.76
Diversion works, dam, Boise River:		
Location	944.70	
Original construction	269,463.75	
Repairing	73,223.65	
		343,632.10
Main South Side Canal:		
Location and survey	6,515.02	
Right of way	3,515.23	
Canal construction	935,596.86	
Structures	182,538.90	
Lining (concrete and timber)	296,642.86	
		1,424,808.87
Distributing system from main canal:		
Location and surveys	37,942.50	
Right of way	5,777.40	
Canal construction	400,235.42	
Structures	271,912.43	
Drainage and wasteway system	51,017.81	
		766,885.56
Storage, Deer Flat Reservoir:		
Location and survey	3,372.74	
Right of way	222,971.17	
Upper Embankment	324,897.89	
Lower Embankment	296,790.41	
Forest Embankment, equalizing channels and puddling reservoir	20,759.34	
		868,791.55
Distributing system from reservoir:		
Location and surveys	21,422.27	
Canal construction, earthwork	250,210.11	
Structures	194,401.16	
Drainage	44,259.46	
		510,293.00

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Storage on Boise River:		
Preliminary investigation and surveys	$63,197.71	
Right of way	44,998.36	
Dam	30,594.87	
Railroad	55,641.69	
Power plant and transmission line	3,122.55	
Wagon road	60,360.68	
General expense	26,695.91	
		$284,611.77
Storage investigation:		
Reservoirs (small), preliminary investigations, location, and surveys	311.44	
Payette Lake	1,679.08	
		1,990.52
Penitentiary Canal:		
Right of way	3,268.45	
Canal construction	14,245.87	
Structures	3,226.07	
		20,740.39
Irrigable lands:		
Farm units, subdivision	15,984.57	
Crop reports, investigations, etc	12,276.42	
		28,260.99
Telephone system:		
Location and surveys	599.81	
Construction	23,416.12	
Operation	2,903.23	
		26,919.16
Operation and maintenance (during construction):		
Reservoir	21,343.51	
Main canal system	112,385.06	
Penitentiary Canal	5,864.50	
		139,593.07
Total building cost, as per debit in cost of work in statement of assets and liabilities		4,679,623.28

IDAHO, MINIDOKA PROJECT[1]

LOCATION AND CLIMATIC CONDITIONS

Counties: Lincoln and Cassia, Idaho; Jackson Lake Reservoir, Uinta, Wyoming.
Townships: 8 to 11 S., Rs. 22 to 25 E., Boise meridian; Jackson Lake Reservoir, Ts. 44 to 46 N., Rs. 114 to 116 W., 6th principal meridian, Wyoming.
Railroads: Minidoka & Southwestern; Oregon Short Line; Salt Lake & Idaho.
Railroad stations: Acequia, Rupert, Heyburn, Burley, and Ashton, Idaho.
Average elevation of irrigable area: 4,225 feet above sea level.
Average annual rainfall on irrigable area: 14 inches.
Range of temperature on irrigable area: −11° to 100°.

WATER SUPPLY

Source of water supply: Snake River supplemented by storage.
Area of drainage basin: 22,600 square miles above diversion dam.
Annual run-off in acre-feet of Snake River at Neeley (16,000 square miles), 1895 to 1908: Maximum, 8,900,000; minimum, 3,830,000; mean, 6,470,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoirs: Jackson Lake—area, 22,600 acres; capacity, 380,000 acre-feet; length of spillway, 160 feet; elevation of spillway above stream bed, 24 feet. Lake Walcott—area, 11,350 acres; total capacity, approximately, 150,000 acre-feet; capacity above

[1] Includes Snake River storage unit described in former reports as a separate project.

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fixed crest of spillway, 53,500 acre-feet; length of spillway, 2,385 feet; elevation of fixed crest of spillway, 42 feet above stream bed.

Storage and diversion dams: Storage dam—type, reenforced concrete piers with 20.5 feet by 8 feet radial gates, terminating in an earth embankment 2,850 feet long on the north side and 200 feet long on the south side; maximum height of concrete section above foundation, 40 feet, above stream bed, 28 feet, earth embankment 4 feet higher than concrete section; length of crest, concrete section, 206 feet, earth, 3,050 feet; volume, 63,000 cubic yards of earth and 3,649 cubic yards of concrete. Minidoka—type, rock fill with concrete regulating works; maximum height, 86 feet; length of masonry, 201 feet; length of rock fill, 736 feet; volume, 242,500 cubic yards.

Length of canals: 12 miles with capacities greater than 800 second-feet; 32 miles with capacities from 301 to 800 second-feet; 119 miles with capacities from 50 to 300 second-feet; approximately 750 miles with capacities less than 50 second-feet.

Dikes: Aggregate length, 2,500 feet.

Water power: 10,000 horsepower.

Irrigable area: Entire project, about 118,700 acres; gravity unit, 70,000 acres; south side pumping unit, 48,700 acres.

Present status of irrigable lands (entire project): 95,100 acres entered subject to the reclamation act, 1,600 acres open to entry, 19,900 acres of State lands, 2,100 acres in private ownership.

RESULTS TO JUNE 30, 1911

MAIN PROJECT

Canals: 12 miles with capacities more than 800 second-feet; 21 miles with capacities from 301 to 800 second-feet; 119 miles with capacities from 50 to 300 second-feet; 433 miles with capacities less than 50 second-feet.

Storage dams: Volume, masonry, 16,564 cubic yards; earth, 146,677 cubic yards; rock fill, 79, 321 cubic yards.

Dikes or levees for protection from overflow: Total length, 3,100 feet; volume, 3,472 cubic yards.

Canal structures: 24 costing over $2,000 each; 38 costing from $500 to $2,000 each; 809 costing less than $500 each.

Bridges: Wood, 19, 50 feet or more in length; 64 less than 50 feet in length; total length, 3,179 feet.

Buildings: Offices, 3; residences, 7; barns and storehouses, 12; power house, 1; pumping stations, 3; switching stations, 2.

Roads: 8 miles.

Telephone lines: 167 miles. Telephones in use, 82.

Transmission lines: 41 miles.

Material excavated: Class 1, earth, 6,965,106 cubic yards; class 2, indurated material, 181,411 cubic yards; class 3, rock, 411,433 cubic yards.

Paving: 87,095 square yards.

Cement used: 38,132 barrels.

Concrete placed: 35,046 cubic yards.

STORAGE UNIT

Storage dams: Volume—3,000 cubic yards of masonry; 33,000 cubic yards of earth; 1,000 cubic yards of rock fill.

Buildings: Offices, 1; road houses. 2.

Roads: 67 miles.

Telephone lines: 67 miles. Telephones in use, 7.

Material excavated: Class 1, earth, 100,000 cubic yards; class 3, rock, 10,000 cubic yards.

Coal mined: 661 tons.

Riprap: 2,000 cubic yards.

Paving: 800 square yards.

Cement used: 3,020 barrels.

Concrete placed: 3,354 cubic yards.

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AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 116,400 acres.
Area irrigated, season of 1911: 52,000 acres.
Length of irrigating season: From April 1 to October 31—214 days.
Character of soil of irrigable area: Clay, sandy loam, and loose sandy soil.
Principal products: Alfalfa, grasses, rye, wheat, oats, sugar beets, potatoes, small fruits.
Principal markets: Pocatello, Idaho; Salt Lake, Utah; Butte and Helena, Mont.

LANDS OPENED FOR IRRIGATION

Dates of public notices and orders relating thereto (gravity unit): Public notices—March 9, 1907; November 23, 1908; February 11, 1909; March 30, 1909; February 7, 1910; March 22, 1910; June 10, 1910; October 13, 1910; November 3 and November 25, 1910; January 23, 1911. Orders—July 19, 1907; December 10, 1907; July 9, 1908; December 27, 1910; March 18, 1911; March 31, 1911; May 4, 1911; June 8, 1911. (South side pumping unit): Order—March 24, 1911.
Location of lands opened: Ts. 8 to 10 S., Rs. 22 to 25 E., Boise meridian.
Present status of irrigable lands opened: 72,400 acres entered subject to the reclamation act, 6,900 acres open to entry, 8,100 acres of State lands, 360 acres in private ownership.
Limit of area of farm units: Public, 80 acres; private, 160 acres.
Duty of water: 3 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $22, $30, and $40.
Annual maintenance and operation charge: $1.75 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

First surveys with reference to storage possibilities in 1902.
Reconnoissance and preliminary surveys for main project begun March, 1903.
Construction authorized by Secretary April 23, 1904.
Minidoka Dam completed September, 1906.
Temporary dam on the Moran site, Jackson Lake, completed in 1907.
North canal and distributing system completed July, 1907.
First irrigation by Reclamation Service, season of 1907.
Power house completed for present use December 1, 1909.
Surveys and borings for permanent dam at Jackson Lake made in 1909 and 1910.
Wagon road (67 miles) to site of dam at Jackson Lake completed August 5, 1910.
Machinery for 9,000 horsepower installed prior to June 30, 1911.
Jackson Lake Dam about 95 per cent completed June 30, 1911.
South side pumping system 80 per cent completed June 30, 1911.
Whole project, 80 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Minidoka project provides for the diversion of the waters of Snake River by a combined storage, diversion, and power dam about 6 miles south of Minidoka, Idaho, into two canal systems, one on either side of the river, watering lands in the vicinity of Rupert, Heyburn, and Burley, Idaho. Power developed at the dam is utilized for pumping water from the canals to irrigate high lands, and also for furnishing heat, light, and current for commercial use to the towns on the project. Storage for the project is provided mainly by a reservoir constructed in the upper drainage basin of Snake River at Jackson Lake, Wyo. This is supplemented by the reservoir formed by the Minidoka Dam, and known as Lake Walcott. Minidoka Dam, a temporary dam at Jackson Lake, and the irrigation system for lands supplied by gravity have been completed. The permanent storage dam at Jackson Lake, the south side pumping unit, and the drainage system for the lands under the gravity canals are under construction.

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CONSTRUCTION DURING FISCAL YEAR

Power station.—The fourth and fifth generating units at the power station were assembled and installed during the year, and placed in service, thus completing the equipment as planned. A new type of runner was installed in one unit, which added about 200 horsepower to its capacity. Some minor work was done on the floors and superstructure of the station, and a lighting system was installed.

South side pumping stations.—Additional equipment was installed at the first and second south side pumping stations, thus completing the number of pumping units originally contemplated. There are now four units at the first station, three at the second, and two at the third. It has been found advisable, however, to install an additional unit at each station, and contracts have been let for the furnishing of these pumps and motors. Pumping-out devices were installed at each station, which very materially lessened the amount of time required to resume operations in cases of shutdowns.

Commercial power.—The erection of the transmission line from Acequia to Rupert, Heyburn, and Burley, Idaho, with the construction of substations at Rupert and at Heyburn, for the purpose of supplying power for commercial and household uses to these towns, was one of the principal features of construction during the year. The substation at Heyburn is located on the north bank of Snake River, and current is transmitted at low voltage across the river and into Burley. The substations are of reenforced concrete, and are of sufficient size to handle all business contemplated from this source for many years. The growth of business during the year exceeded expectations. A duplicate transmission line from the Minidoka Dam to the second lift station, located on the south side of the river, is intended to relieve the present line in the event of needed repairs or the occurrence of accidents. Four miles were completed by force account and contract and 3 additional miles of poles were set. Towers for the river crossing near the dam were received.

Minidoka Dam.—In order to stop the erosion of the south bank of the river a short distance below the Minidoka Dam, a reenforced concrete wall nearly 1,000 feet long and with a maximum height of about 12 feet was constructed across a portion of the river channel. Repairs to the earth and rock fill portion of the dam were necessitated by a settlement which occurred when storage was effected in Lake Walcott for the first time by means of the piers and flashboards along the spillway. All of this work was done by force account.

South Side Canal.—During the winter the south side canal was again enlarged under small contracts and by force account, thus completing work which has been carried on during the winter seasons for three years and giving the canal sufficient capacity to supply water for the pumping unit as well as the gravity lands.

Construction of the distribution system for State lands was continued and is now nearly completed. Three small diversion structures were built in Marsh Creek to divert its flow into the pumping canals and permanent canal crossings were constructed across Goose Creek.

Project extensions.—A tract of 650 acres was added to the gravity unit by raising the banks of a branch canal and constructing a distribution system by contract and surveys and estimates were made for several other small gravity and pumping extensions.

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North side drainage system.—Work was continued on the north side drainage system with two drag-line steam excavating machines and also with teams under small contracts and by force account. Structures for crossings were installed both by contract and by force account. Several 6-inch drainage outlets were drilled, but proved successful only in the northern part of the project.

Jackson Lake Dam.—On the Snake River storage unit the construction of the permanent storage dam at Jackson Lake, Wyo., was undertaken and such progress was made that by June 30, 1911, 95 per cent of the work was completed. This dam is designed to store 380,000 acre-feet of water by raising the level of Jackson Lake. It consists of a central reenforced concrete gate section with concrete abutments and earth dikes on either end. The gate section is composed of 23 reenforced concrete piers 33 feet high (28 feet above the crib and 5 feet and less below) and 2 feet thick. The width is 34 feet from the bottom to the floor of the crib. Here it begins to narrow down on a 1:1 slope for 13 feet 6 inches on the downstream side; 10 feet up from the floor of the crib on the upstream side it narrows 2 feet; this leaves a width of 18 feet 6 inches to the top. At the two quarter points in the dam two piers are side by side, with an expansion joint between them; otherwise the piers are 8 feet apart (10 feet on centers). Running lengthwise of the dam is a 12-foot roadway and gate-operating platform supported by reenforced concrete girders between piers. Eleven feet below the roadway is a horizontal floor 12 inches thick and 16½ feet wide, supported by girders. This forms an opening through the top of the dam that is utilized as a spillway, the crest elevation of which may be controlled by flashboards. The space between the piers from the floor down is closed for 12 feet with a curtain wall varying in thickness from 14 inches to 19 inches and for the remaining 5 feet by twenty 5 feet by 8 feet radial gates operated by means of a winch traveling along the top of the dam.

The foundation of the dam is 51 feet 8 inches wide and is built as follows: In the north quarter the piers described above are each supported upon ten 12 by 12's, shod and driven to bedrock. These are surrounded by cribworks 10 feet deep resting upon gravel and made water-tight by a row of 10-inch sheeting at the upper and lower ends. In the next quarter south the piers are extended to bedrock and surrounded by cribwork from 6 to 8 feet deep, faced with 10-inch sheeting as above. In the south half the foundation is solid concrete from bedrock to the gate sills. The north abutment is supported upon gravel and sheet piles and is of a gravity type, with wing walls. The south abutment is the same except that it is founded upon rock and anchored to same with reenforcing bars. Dikes extend from the north and south ends of the gate section 2,850 and 200 feet, respectively, over a low, broad flat to the high land. The dikes have a top width of 15 feet, a height of 4 feet above the top of dam; a slope of 3 : 1 on the upstream side and 2 : 1 on the downstream side below the water level and 2¼ : 1 on the upstream side and 1½ : 1 on the downstream side above the water level. The top of the dikes are 8 feet above the maximum water surface.

It has been planned to construct this dam after the irrigation season of 1911, and as a preliminary to this a wagon road and telephone line 67 miles long, from Ashton, Idaho, the nearest railroad

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station, to Moran, Wyo., was started on May 27, 1910, and was about half finished when on July 5, with the water surface of the reservoir at 6,746 (0.6 feet lower than it had reached the year before), the middle third of the superstructure of the temporary dam tore away from the cribwork and liberated a flow of 12,000 second-feet of stored water. As water had to be stored for the 1911 irrigation season, this accident to the temporary dam made it necessary to undertake the construction of the permanent dam without delay. With this end in view sawmill, pumping, pile driving, and concreting machinery was procured, contracts for logging let, warehouse and office established at Ashton, and the construction work on the road and telephone line rushed as much as possible.

On August 5 the wagon road was completed and on the following day work was started on the diversion works, consisting of a channel 500 feet long, 100 feet wide, and 8 feet deep, and a flume 150 feet long, 70 feet wide, 3 feet 10 inches deep around the north end of the dam and through the old temporary dike.

About the middle of August two pile drivers had been erected and sheet-piles from the sawmill were being driven in the dike section of the dam to serve as a cut-off wall for the diversion flume. With the completion of the electric-light plant on September 1 the sawmill was run double shift, getting out sheet-piles, crib timbers, and lumber for the camp.

A quarry for rock filling and riprap was opened on the south side of the river about a mile downstream and the hauling of rock to the site was begun.

On September 7 the earth cofferdam was completed, but as there was considerable leakage under it a row of sheet-piles were driven across the river to cut off the underflow. This being finished on September 13, excavation for the foundation was begun at the north end. On October 5 bedrock was encountered on the south end about 6 feet above the elevation of the gate sills and when exposed was found to dip from this point nearly uniformly to a depth of 19 feet below the elevation of the gate sills at the north end. Borings into this rock to a depth of 27 feet (elevation 6,694.5) developed a good quality of rock. The quarry force was now shifted to the site of the dam and completed the rock excavation during the latter part of October. The 40 teams which had been excavating for the dam foundation were set to improving the river channel below the dam. A good, clean quality of sand and gravel, well graded, was encountered here and was screened and stored near the mixing plant preparatory to placing concrete, which was begun on November 6. The dam was now housed in and the concrete kept from freezing with the aid of steam pipes and fires. In this manner concrete was laid until the second week in January, sometimes with the thermometer registering 30° below zero. The principal work during the winter months consisted of assembling the radial gates (the first of which reached the site of the dam on Jan. 21) and hanging them, building forms, placing steel, driving round piles, quarrying, and hauling rock for riprap.

In April concreting was resumed, the diversion channel was closed, and work on the dike and river improvement above the dam with teams and two drag line buckets was begun and continued to the end of the fiscal year, at which time the concrete work was prac-

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tically finished. The remaining work consists of dike construction, excavation of river channel, and driving of 360 round piles above the dam.

During the year 67 miles of road and telephone line and two road houses were constructed; about 90,000 cubic yards of earth and rock were excavated; more than 3,000 cubic yards of concrete was placed; 3,000 yards of stone was quarried, hauled, and placed; 233 round piles and 2,645 sheet piles were driven; more than 1,500,000 feet of lumber was sawed; 661 tons of coal was mined; and 20 gates (involving 108,000 pounds of iron and steel and 7,000 feet b. m. of lumber) were installed.

OPERATION AND MAINTENANCE

On the gravity unit of the project the service operates and maintains the canals and laterals only, delivering water to the heads of sublaterals which are operated and maintained by independent organizations of the settlers. This arrangement has proved unsatisfactory for various reasons, and certain changes in the method of distribution are contemplated which it is believed will create more satisfactory conditions. On the pumping unit the service maintains and operates the entire distribution system, supplying water to each farm unit.

In 1910 water delivery began on April 1 both on the gravity and pumping units. The natural flow of the river was unusually low during July and August and plans had been made to supplement this with stored water from the temporary dam at Jackson Lake. Early in July, however, this structure failed, releasing the impounded waters earlier than had been intended. Enough water was caught at Lake Walcott so that by judicious use the crops were saved without damage. About 27,000 acres were cultivated under the gravity unit during 1910, water being supplied for irrigation until October 31. Two hundred and forty-eight thousand acre-feet of water were delivered to the sublaterals on the north side of Snake River and 88,200 acre-feet to the sublaterals on the south side of the river. The soil on the north side, being mainly of a light and sandy nature, requires large amounts of water for irrigation. Water was supplied on a rental basis to 11,000 acres of lands under the pumping unit. There has been no large increase in the irrigated area under the gravity system in 1911, but in the pumping tract about 20,000 acres are being irrigated.

Water is being furnished to the lands under the pumping unit for 1911 without the advance payment of any charges, but under the terms of the order of March 24, 1911, the cost of operation and maintenance for the year will be assessed against all lands irrigable under the unit, and will be payable in the spring of 1912.

Maintenance of the irrigation system has been attended with less difficulty on the gravity unit than in former years.

The lands surrounding the canal systems have become cultivated in larger areas and the soil is thus afforded less opportunity to be blown by the spring winds. The canals and lateral systems are benefited materially in this way and maintenance costs are reduced. On the pumping unit much of the land is still uncultivated, but the system is becoming seasoned, and being of a less sandy nature is affording less trouble and expense in proportion than on the gravity

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lands. Brush covering is laid on the inner slopes of the main canals as necessity dictates each year after the water is turned out of the system and thus the banks are protected from erosion.

The use of the necessarily large heads of water on the north side of the river has shown the need for drainage and the waste-water system is being constructed as fast as conditions will permit.

SETTLEMENT AND IRRIGATION

The more desirable farm units under the gravity system of the project have long since been filed upon, and but few of the remaining units were settled during the year 1910. On the south-side pumping tract nearly all of the homestead land is settled.

There have been a number of reductions in the size of farm units by division into forties, usually in the cases of entries upon which the five-year proof has been accepted. This tends to a more intensive cultivation and an increased population on the project, both of which are desirable results. The growth of the towns on the project has been steady and healthy and numerous residences and business buildings of a permanent character have been erected. A creamery was established in Rupert and opened for operation in February, 1911.

In April, 1911, a sale of reappraised lots north of Tenth Street in Heyburn was held, and a number of the lots were sold. The State land board of Idaho offered for public sale a portion of the State holdings on both sides of the river to the extent of several thousand acres, and a considerable area was sold.

The branch railroad lines from Burley to Oakley, Idaho, and from Rupert to Bliss, Idaho, were practically completed and were opened to operation, and construction was begun on a new branch leading from Burley east into the Raft River Valley.

The springs of 1910 and 1911 were more favorable to the production of crops on the project than those of previous years, owing to the fact that high winds were less prevalent. Excellent crops were grown in 1910, the yields of alfalfa and clover on the north side of the river being especially large. The season of 1911 started well, and although the lateness of the spring retarded plant growth somewhat, good crops are expected.

PUBLIC NOTICE DATED OCTOBER 13, 1910

1. By public notice issued February 7, 1910, for the Minidoka project, Idaho, under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), it was announced that water will not be available in 1910 for the high areas of many of the farm units containing more than 3 acres above the grade of gravity distribution as provided in the public notice of July 19, 1907, and that in order to provide for a more equitable apportionment of the charges amended township plats would be filed as soon as practicable, showing separately for each farm unit the acreage irrigable by gravity and the high-land area irrigable by pumping or otherwise.

2. Revised plats of the following townships under the said project have been prepared and placed on file in the local land office at Hailey, Idaho, namely: Tps. 9 and 10 S., Rs. 22 and 23 E.; Tps. 8, 9, and 10 S., R. 24 E.; Tps. 8 and 9 S., R. 25 E. These plats were approved on June 18, 1910, and are amendatory of and supplemental to the plats and list now on file in the local land office, showing separately for each farm unit the acreage which it is practicable to irrigate by gravity and the total ultimate irrigable area. The difference between these two figures will indicate the high-land areas irrigable by pumping or otherwise.

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3. For lands irrigable by gravity in 1909 and prior years, the times, terms and conditions of payment of the water-right charges shall be as heretofore announced, and all payments heretofore made shall be credited upon the charges for the gravity-land areas: *Provided*, That whenever lands are added to the areas under the grade of gravity distribution the first installment of the charges for building, operation, and maintenance therefor shall become due on the 1st day of the following December: *And provided further*, That where the added gravity lands are made available by means of additional expenditures on the part of the United States the water users shall pay for such additional work as may be assessed by the Secretary of the Interior. The irrigable areas shown on the plats have been carefully resurveyed and wherever the gravity area has been increased the first installment of the charges for building, operation, and maintenance on the added area shall become due December 1, 1910. Certain other areas have been reduced and the charges heretofore paid shall be adjusted to such reduced area. The amended areas are shown on a list on file in the local land office at Hailey, Idaho, giving areas and dates when the installments become due.

4. For all high-land areas indicated upon said amended plats payment of the charges for building, operation, and maintenance shall not become due until such time as means shall have been provided for the reclamation thereof by pumping or otherwise, whereupon public notice shall be given announcing the charges which shall be made per acre upon such high areas, the number of annual installments not exceeding 10 in which such charges shall be paid and the time when such payments shall commence. The charges to be announced for such lands shall include an equitable apportionment of the costs on account of construction, operation, and maintenance of any pumping system or other expenditures incurred by the United States for the reclamation of such high lands.

5. The owner or entryman legally in possession of any farm unit shown on said amended plats, may, on or before December 1, 1910, file with the receiver of the United States land office of the district in which his land is located an acceptance in writing of all the terms and conditions of this notice, such acceptance to be in the following form:

"I, ..., owner, or entryman, legally in possession of farm unit ..... (or other proper description), sec. ....., T. ..... S., R ..... E., B. M., do hereby accept and agree to comply with the terms and conditions of the public notice dated..... ...., 1910, issued in pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), for the Minidoka project and all public notices and orders amendatory thereof or supplementary thereto; and my water-right application for said tract of land is hereby amended to conform in irrigable area to the amended plats filed with said public notice."

6. All farm units shown on these plats for which the acceptance set out in section 5 of this notice is duly executed and filed in the local land office at Hailey, Idaho, by the owner or entryman legally in possession thereof shall be subject to the terms and conditions set out in sections 3 and 4 hereof.

7. Should the owner or entryman legally in possession of any farm unit affected by this notice fail to file the written acceptance as hereinabove provided on or before December 1, 1910, he will be presumed to have elected not to take advantage of the provisions of this notice, but to continue to receive the water provided for in his water-right application from gravity canals or laterals and to distribute the same over his farm unit by his own means, and in such case the charges, terms, and conditions shall continue subject to the public notices and orders heretofore issued and applicable thereto.

8. All water-right applications hereafter filed must be accompanied by at least one installment of the charges for building, operation, and maintenance, plus the portions of installments for operation and maintenance which have become due and remain unpaid, or which would have become due had the application been filed on March 31, 1909, or which were paid in the case of a prior entry and upon relinquishment were not assigned.

PUBLIC NOTICE DATED NOVEMBER 3, 1910

1. In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), public notice for the Minidoka project, Idaho, is issued as follows:

2. Certain sublaterals are not being maintained or operated in proper manner by the district organization, with the result that some of the lands entitled to water can not be properly irrigated.

3. In order to maintain the efficiency of the sublaterals so that all lands entitled to water may receive an adequate supply, notice is hereby given that in any case where such ditches are not maintained in a proper condition or state of repair by the water

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users or properly operated, the necessary work will be done and materials and supplies purchased or services employed by the United States for the proper maintenance and operation of the said ditches.

4. The cost of all such work, materials, and supplies will be charged equitably against the land benefited thereby, as part of the installment of the charges under the reclamation act. The charges therefor shall become due on December 1 of the year in which the work is done, and no water shall be furnished in any subsequent year for any tract until all such charges against the same shall have been paid.

PUBLIC NOTICE DATED NOVEMBER 25, 1910

1. Nearly all the private and school lands shown on the farm unit plats of the Minidoka project, Idaho, heretofore made subject to public notice under the terms of the reclamation act of June 17, 1902 (32 Stat., 388), is being held out of cultivation. A continuance of this condition will result in the forfeiture of that part of the water appropriation of the project filed in 1903, which is intended for use on this land, and the postponement of its priority to a much later date. More stored water will then be required for such land, which will involve a greater cost to provide storage.

2. It is, therefore, equitable that an added charge for the necessary additional cost of storage should be assessed against such of the private and school lands as are not included in water-right applications within a reasonable time after the publication of this notice.

3. The areas in question are shown on farm unit plats of the following townships: Boise Meridian, Tps. 9 and 10 S., Rs. 22 and 23 E.; Tps. 8, 9, and 10 S., R. 24 E.; Tps. 8 and 9 S., R. 25 E. approved by the Secretary of the Interior on June 18, 1910.

4. Notice is hereby given that for all lands shown on such plats for which water-right application shall be filed on or after July 1, 1911, and which are at the time in private ownership, the building charge shall be $40 per acre of irrigable land, payable in not more than 10 annual installments, each payment not less than $4 or some multiple thereof per acre. The term "private ownership" as here used shall apply to lands not heretofore entered subject to the terms of the reclamation act, or not now subject to such entry.

5. Such water-right applications shall be accompanied by the first installment of the building charge, $4 per acre of irrigable land, plus the portions of installments for operation and maintenance which would have become due had the application been filed on March 31, 1909. The second installment of the charges for building, operation, and maintenance shall become due on December 1 of the following year and subsequent installments on December 1 of each year thereafter until fully paid.

6. In case of transfer of land for which water-right application was made prior to July 1, 1911, and payment made thereon, credit for such payment may be assigned by the former applicant in all cases where such application has not been canceled for failure to comply with the law, but no such credit will be allowed nor may the new applicant have the benefit of the lower building charges unless a proper assignment of credit has been filed. If the former water-right application had been canceled for failure to comply with the law, or if at the time of assignment no payment had been made on the water-right application, one or more payments being due under the public notices, the assignee shall not be permitted to apply under the former rates of charges.

ORDER DATED DECEMBER 27, 1910

Section 4 of the public notice issued October 13, 1910, for the Minidoka project, Idaho, refers to the future irrigation of high land areas by the United States, and in order that the settlers may indicate their desire for such irrigation before it is undertaken it is hereby ordered—

1. In cases of those high land areas which are to be reclaimed by the United States the probable cost per acre of each farm unit in a given high land area shall be announced in due time by the supervising engineer to the settlers interested. This figure as announced shall be understood to be approximate only, and the charges to be paid shall subsequently be fixed by the Secretary of the Interior, by public notice, when water is ready to be furnished.

2. After such announcement has been made by the supervising engineer, construction work will not be started until after a request, asking that the work be taken up, signed by settlers representing at least 50 per cent of the acreage affected and entered, is received by the supervising engineer.

3. Only those settlers who, before March 31, 1911, shall have signed the agreement required by the public notice of October 13, 1910, shall be affected by this order.

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PUBLIC NOTICE DATED JANUARY 23, 1911

1. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), notice is hereby given that the portion of the installment on account of operation and maintenance for the Minidoka project, Idaho, heretofore announced at 75 cents per acre of gravity land shall be increased to cover the cost of drainage works necessary for the proper operation and maintenance of the project.

2. This additional charge shall be assessed against the gravity acreage on the north side of Snake River as shown on the farm unit plats of the Minidoka project, approved by the Secretary of the Interior, June 18, 1910, and filed in the local land office at Hailey, Idaho. This additional charge shall be $1 per acre per annum, and shall remain in effect until further notice. The portion of the installment for operation and maintenance for such lands for the year 1911, due December 1, 1911, shall therefore be $1.75 per acre and so continue until further notice, becoming due on December 1 of each year. Payment of these charges (for the year 1911) must be made on or before April 1, 1912, and in like manner for subsequent years.

3. The regulation is hereby established that no water will be furnished in any year to any such lands until payment is made of all charges then due for operation and maintenance. Accordingly, payment of said increased portion of the installment due December 1, 1911, as well as all charges for operation and maintenance for prior years, must be made on or before April 1, 1912, in order to secure delivery of water at the beginning of the irrigation season, and similarly in subsequent years.

ORDER DATED MARCH 18, 1911

1. In pursuance of the act of Congress, approved February 13, 1911 (Public No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section 4 of the reclamation act and for other purposes," the following order is promulgated for the purpose of relieving the present situation of the gravity lands under the Minidoka project pending the issuance of public notice modifying or abrogating the notices heretofore issued.

2. A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment will become effective as to all entries and water-right applications subject to the public notices and orders heretofore issued upon the payment on or before March 31, 1911, of $1 per acre plus the operation and maintenance charges which have heretofore become due and remain unpaid and subject also to compliance with the conditions of a public notice to be hereafter issued which will provide for an increased building charge.

3. Such stay of proceedings shall remain in effect until further announcement by means of a public notice or otherwise. No water will be furnished in any case unless the holdings of the applicant shall have been conformed to the farm unit subdivisions shown on the approved farm unit plats.

4. Upon failure to make payments as herein required on or before March 31, 1911, the entry or water-right application, or both, as the case may be, which would otherwise be subject to cancellation, will be promptly canceled without further notice.

5. All applications for water rights filed under the provisions of notices heretofore issued and for which the payment necessary to avoid cancellation shall have been made on or before March 31, 1911, shall be continued in effect under such prior notices; and water-right applications may be filed on or before March 31, 1911, under the provisions of the public notices heretofore issued if accompanied by the payments required thereunder and shall be entitled to continue under the terms thereof.

6. The intent of this order is to permit owners or occupants of irrigated gravity lands who so desire to obtain the benefit of the former building charge of $22 or $30 per acre by making the necessary payments on or before March 31, 1911, and complying with the other provisions of prior notices and orders; and that all other owners or occupants of such lands who desire may be furnished with a water supply upon payment of the sums herein specified, and they shall be subject to the conditions of such public notice as may be hereafter issued.

ORDER DATED MARCH 24, 1911

1. To afford an opportunity for the operation of the irrigation works and pumping plant for the lands above the gravity supply in the Minidoka project, Idaho, on the south side of Snake River, under service conditions and as preliminary to the regular opening of the project, water will be furnished from the south side pumping unit in the irrigation season of 1911 for the irrigable lands as applied for.

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2. The charges for operation and maintenance which shall be made for each acre of irrigable land within the project (as shown on farm unit plats approved in connection with the public notice to be hereafter issued) shall be determined in accordance with the estimated cost of operation during the season of 1911, as hereafter announced, and the same shall be payable at the beginning of the irrigation season of 1912 by the water-right applicant, in accordance with the terms of the public notice to be hereafter issued as aforesaid.

ORDER DATED MARCH 31, 1911

Under the order of March 18, 1911, issued for the Minidoka project, Idaho, payment was required to be made on or before March 31, 1911. On account of the short time allowed it is hereby ordered that the cancellations provided for in such order on account of failure to pay shall not take place if payment as therein required be made on or before April 27, 1911.

ORDER DATED MAY 4, 1911

1. Additional works have been constructed under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), for the Minidoka project, Idaho, and water will be available in the irrigation season of 1911 for the high land areas listed below, which lie above the former grade of gravity distribution; the farm units affected are also shown on the revised farm-unit plats of townships 9 south, ranges 22 and 23 east, Boise meridian, approved on April 15, 1911, and on file at the local land office at Hailey, Idaho.

2. *Areas irrigable by construction of C-2 raise*

Farm unit	Section	Township south	Range east	High land area irrigable by C-2 raise
A	12	9	22	2
B	13	9	22	24
C	13	9	22	7
G	13	9	22	10
A	14	9	22	52
	23	9	22	
A	7	9	23	29
C	7	9	23	47
D	7	9	23	52
	12	9	23	
A	8	9	23	18
B	8	9	23	17
C	8	9	23	37
D	8	9	23	34
E	8	9	23	72
F	8	9	23	72
G	8	9	23	34
C	9	9	23	6
D	9	9	23	21
A	17	9	23	4
B	17	9	23	54
C	17	9	23	2
A	18	9	23	45
B	18	9	23	4
C	18	9	23	5
D	18	9	23	7

3. Water will be furnished in the irrigation season of 1911 to all lands herein listed whose owners or occupants make written application to the project engineer. Payment for such water service in 1911 must be made on or before April 1, 1912, at the rate of 75 cents per acre of irrigable land, and water will not be furnished in 1912 until full payments have been made of all amounts due for water furnished hereunder in 1911. Public notice will be hereafter issued, which shall announce the charges, terms, and conditions under which water-right applications may be made for such lands.

ORDER DATED JUNE 8, 1911

In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), and the provisions of the act of February 13, 1911 (Public, No. 353), the following order is issued for the gravity unit of the Minidoka project, Idaho, pending the preparation of a public notice providing for the future plan of payment:

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1. A considerable number of water-right applicants under public notices and orders heretofore issued have not made payment of the portion of the installment for operation and maintenance which is required as a condition of the delivery of water during the irrigation season of 1911. It is reported that a number of those who have not made this payment desire to secure water for the irrigation of their lands and the raising of crops during the present season and will promptly make payment of all charges for building, operation, and maintenance which should have been paid on or before April 27, 1911, as soon as they are financially able to do so. The interests of the project as a whole, in order to secure continuous development of the agricultural possibilities, and the unusual conditions now existing justify the adoption of some plan to permit the delivery of water for the present irrigation season under such conditions as will secure early payment of the charges which should have been paid at or before the beginning of the irrigation season.

2. The passage of the act of February 13, 1911, and the necessity of issuing orders thereunder to meet conditions then existing as a temporary plan preliminary to the preparation of a public notice have made it impracticable to announce definitely at this time the charges to be required in the future, so that the water users might be informed as to the obligations to be assumed by those who may desire to amend their present contracts. Accordingly the adoption of a plan for the furnishing of water for the present irrigation season is considered necessary as a temporary expedient, and such plan will not be regarded as a precedent for any future year.

3. Water will be furnished for the irrigation of lands in the irrigation season of 1911 in all such cases where payment of the operation and maintenance charge now due has not been made, upon the filing at the project office of a statement by the water-right applicant showing that he has heretofore complied in good faith with the requirements of the reclamation act, except as to the payments required thereunder, and that he will pay all charges for building, operation, and maintenance which should have been paid on or before April 27, 1911, as soon as he is financially able to do so, not later than December 1, 1911. Such statement must be vouched for by the directors of the voluntary association of water users on the project, known as the Minidoka Water Users' Association, which has been organized as preliminary to the association provided for under the terms of section 6 of the reclamation act. Applicants rejected by the directors of the water users' association may appeal to the supervising engineer, who may order that water be delivered.

4. This order shall not be construed as a stay of proceedings for any water-right application or homestead entry now subject to cancellation under the provisions of the reclamation act, but is intended to provide a temporary expedient for the delivery of water to those not now financially able to make payment of the charge for operation and maintenance.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Minidoka project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1911	Completion due
55	July 8, 1905	Monarch & Porter.....	Canals and structures.	$194,826.75	$185,047.11	Aug. 21, 1906
247	Aug. 5, 1908	Allis-Chalmers Co.....	Electrical apparatus.	44,590.00	39,710.00	Sept. 27, 1911
248	.....do.....	.....do.....	Turbines and pumps	193,617.00	106,804.50	.....do.....
249	July 29, 1908	General Electric Co...	Electrical apparatus	7,660.00	[1] 7,660.00	Jan. 29, 1909
250	Aug. 12, 1908	Westinghouse Electric & Manufacturing Co...	.....do.....	127,892.35	109,956.67	.....do.....
259	Oct. 30, 1908					
267	Dec. 18, 1908	.....do.....	.....do.....	750.00	750.00	Dec. 31, 1910
279	Feb. 26, 1909	Fulton Engine Works	Gates.....	10,994.00	7,759.00	Mar. 25, 1909
285	July 18, 1908	S. Morgan Smith Co.	Pumping apparatus.	11,530.00	[1] 11,662.05	.....
290	June 23, 1909	Fulton Engine Works	Gate-controlling apparatus.	8,046.00	7,203.10	Jan. 15, 1910
324	Apr. 28, 1910	Standard Underground Cable Co.	Copper wire.....	3,174.87	[1] 3,248.37	.....
325	May 6, 1910	General Electric Co...	Substation equipment.	10,760.00	6,862.50	Sept. 1, 1910
363	Apr. 11, 1911	Standard Underground Cable Co.	Copper wire.....	2,455.53	[1] 2,455.53	May 2, 1911

[1] Completed.

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Minidoka project

ASSETS

Accounts receivable:			
Uncollected miscellaneous rentals		$1,425.54	
Uncollected miscellaneous		1,052.02	
Uncollected water-right building charges		151,906.41	
Uncollected water-right operation and maintenance charges		13,479.42	
Collections by General Land Office		5,099.72	
			$172,963.11
Inventories:			
Mercantile store		8,766.68	
Government animals		10,413.00	
Equipment in use	$88,109.13		
Less depreciation	45,335.26		
		42,773.87	
Storehouse		50,794.76	
Cement		6,452.25	
Iron and steel		4,654.40	
Lumber		11,688.89	
Explosives		2,453.27	
Forage		11,119.95	
Fuel		2,860.71	
Cash in office safe		360.52	
Local products		2,976.98	
Unadjusted transfers		499.82	
Freight and handling undistributed		1,764.41	
			157,579.51
Cost of work:			
Building cost	3,978,737.79		
Plus adjustments	5,955.06		
		3,984,692.85	
Less adjustments	10,235.55		
Less accrued revenues	28,123.22		
		38,358.77	
			3,946,334.08
Operation and maintenance cost		307,700.17	
Less accrued revenues		158.40	
			307,541.77
Total assets			4,584,418.47

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$3,973,928.38		
Transfer vouchers received	202,168.80		
		4,176,097.18	
Collection vouchers	353,009.33		
Transfer vouchers issued	81,871.28		
		434,880.61	
			3,741,216.57
Accounts payable:			
Unpaid labor		17,924.70	
Unpaid purchases		111,235.04	
Unpaid contract estimates		15,848.71	
Unpaid freight and express		24,184.42	
Unpaid passenger fares		16.60	
Unredeemed coupon books		398.70	
Unredeemed meal tickets		383.73	
Unpaid miscellaneous		548.47	
			170,540.37

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Repayments accrued:		
Building	$538,606.38	
Operation and maintenance	134,055.15	
		$672,661.53
Total liabilities		4,584,418.47

Feature costs to June 30, 1911, Minidoka project

Gravity system:		
Diversion dam and spillway		$566,167.36
Main canals, north and south side:		
Earthwork	$540,993.51	
Structures	81,614.43	
West end extension	8,108.62	
		630,716.56
Distribution system:		
Earthwork	286,989.50	
Structures	175,283.01	
		462,272.51
Pumping system power plant at dam:		
Buildings	87,337.08	
Machinery and installation	257,293.24	
Enlargement of diversion channel	59,931.71	
Operation and maintenance of plant when not charged to operation and maintenance of project	14,432.97	
		418,995.00
Pumping stations:		
Temporary plant south side	9,563.98	
Station No. 1, machinery, pressure pipe and camp No. 1	151,234.09	
Station No. 2, machinery, pressure pipe and camp No. 2	138,868.46	
Station No. 3, machinery, pressure pipe and camp No. 3	76,227.89	
Operation and maintenance of, when not charged to operation and maintenance of project	22,151.82	
		398,046.24
Commercial power building, transformer substation		14,001.02
Wasteways and feeders:		
Earthwork	485,482.15	
Structures	160,150.63	
Operation of canal system when not charged to operation and maintenance of project	44,070.93	
		689,703.71
Transmission system:		
Building	42,899.83	
Operation	1,495.97	
		44,395.80
Telephone system:		
Building	26,221.73	
Operation	2,498.26	
		28,719.99
Real estate (rights and property; lands purchased)		37,109.77
Buildings, construction		48,873.80
Irrigable lands, farm units, subdivisions		3,834.29
Roads and highways:		
Construction	3,808.10	
Maintenance	2,132.16	
		5,940.26
Wells, drilling		3,127.06
Examination of project as a whole		77,288.10
Administration of project as a whole:		
General expense	121,796.47	
Engineering—undistributed to features	25,979.68	
		147,776.15
Total building cost		3,576,967.62

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Operation and maintenance:		
Gravity system—		
Telephone system	$5,722.48	
Experimental farms	11,904.82	
Dam headworks	942.29	
Canal and sublateral system	81,261.79	
Jackson Lake Dam	6,551.16	
Administration	54,202.82	
Engineering	7,863.94	
Wasteway system	124,146.03	
		$292,595.33
Pumping system—		
Telephone system	170.63	
Power diversion	5,923.59	
Administration charges	2,767.34	
Canals and sublateral system	6,243.28	
		15,104.84
Total operation and maintenance cost		307,700.17
Total building and operation and maintenance cost		3,884,667.79

SNAKE RIVER STORAGE UNIT

Swan Valley Reservoir:		
Reconnoissance	$632.93	
Right of way	10,741.81	
		11,374.74
Jackson Lake Dam (temporary):		
Buildings and quarters	361.91	
Crib dam and embankment	26,486.52	
Right of way	3,056.69	
Road building	297.91	
General expense	916.27	
		31,119.30
Jackson Lake Dam (permanent):		
Preliminary expense—		
Surveys and reconnoissance	6,773.05	
Testing	7,264.86	
Right of way	3,426.50	
		17,464.41
Camp building—		
Construction	28,968.76	
Maintenance	7,837.98	
		36,806.74
Wagon roads—		
Ashton-Moran Road	17,678.54	
Roads at dam site	715.01	
		18,393.55
Road houses, Cascade and Squirrel meadows—		
Construction	2,602.48	
Maintenance	143.90	
		2,746.38
Telephone line—		
Construction	5,305.43	
Maintenance	956.10	
		6,261.53
Dam construction—		
Excavation for foundations	19,401.14	
Diversion channel	18,532.08	
Cofferdams	6,664.90	
Pumping	26,890.24	
Crib construction	15,920.79	
Pile driving	13,155.64	
Concrete construction	88,497.21	
Outlet works	18,473.16	
Dike construction	21,420.68	
Timber work (main structure)	849.96	
Clearing dam site	1,104.59	
		230,910.39

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Jackson Lake Dam (permanent)—Continued.		
River channel improvement—		
Excavation below dam	$12,963.29	
Wrecking temporary dam	2,227.69	
Excavation above dam	6,411.32	
Trash racks above dam	211.42	
Protection below dam	7,420.43	
		$29,234.15
Rock quarry operation		9,628.93
Inventory of cost ledger supplies		194.17
Total building cost		394,134.29
Operation and maintenance		7,635.88
Total building and operation and maintenance cost		401,770.17

RECAPITULATION

Building cost:		
Minidoka project	$3,576,967.62	
Snake River Storage unit	401,770.17	
		3,978,737.79
Operation and maintenance cost, Minidoka project		307,700.17
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		4,286,437.96

KANSAS, GARDEN CITY PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Finney and Kearny.
Townships: 23 and 24 S., Rs. 32 to 34 W., sixth principal meridian.
Railroad: Atchison, Topeka & Santa Fe.
Railroad stations: Garden City and Deerfield, Kans.
Average elevation of irrigable area: 2,925 feet above sea level.
Average annual rainfall on irrigable area: 20 inches.
Range of temperature on irrigable area: −20° to 105°.

WATER SUPPLY

Source of water supply: Shallow wells near Arkansas River.

DATA FOR COMPLETE PROJECT

Length of canals: 2.1 miles with capacities from 300 to 50 second-feet and 1.7 miles with capacities less than 50 second-feet constructed and operated by the Reclamation Service; 20 miles of main canal and 12 miles of laterals constructed and operated by the water users.
Wells: 216; 15 inches diameter, 35 to 60 feet deep.
Steam power: 600 horsepower developed in steam-turbine power plant.
Irrigable area: 10,677 acres.
Present status of irrigable lands: All in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 2.1 miles with capacities from 50 to 300 second-feet; 1.7 miles with capacities less than 50 second-feet.
Canal structures: 1 costing over $2,000; 3 costing less than $500 each.
Bridges: Wood, 3 less than 50 feet in length; total length, 60 feet.
Buildings: Residences, 1; barns and storehouses, 2; power house, 1; pump houses, 23.
Telephone lines: 5 miles. Telephones in use: 4.
Transmission lines: 4¼ miles.
Material excavated: Class 1, earth, 66,400 cubic yards.
Cement used: 7,571 barrels.
Concrete placed: 5,338 cubic yards.
Wells: 216, 15 inches diameter, 35 to 60 feet deep, total 8,800 feet.

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AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: No water being supplied by Reclamation Service, on account of failure of water users to pay back charges.
Length of irrigating season: From April 1 to October 30—213 days.
Character of soil of irrigable area: Fertile black sandy loam.
Principal products: Alfalfa, sugar beets, melons, sweet potatoes, small fruits.
Principal markets: Garden City, Kans.; Kansas City, Mo.; Chicago, Ill.

LANDS OPENED FOR IRRIGATION

Dates of public notices: March 6, 1908, and November 30, 1908.
Location of lands opened: Ts. 23 and 24 S., Rs. 32, 33, and 34 W., sixth principal meridian.
Irrigable lands opened: 10,677 acres, all in private ownership.
Limit of area of farm units: 160 acres.
Duty of water: 2 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $37.50.
Annual operation and maintenance charge: $2.75 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance made and preliminary surveys begun in 1904.
Construction authorized by Secretary October 5, 1905.
Power plant completed July, 1907.
Conduit and siphon completed July, 1907.
First irrigation by Reclamation Service, season of 1908.
Wells completed April, 1908.
Pumps: 10 installed in 1907, 13 installed in 1908.
Whole project 98 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Garden City project provides for the utilization by pumping of the underground flow of the Arkansas River Valley to supplement the normal flow of Arkansas River distributed through the Farmers ditch to irrigate lands northwest of Garden City, Kans.

A power house is located on the main line of the Atchison, Topeka and Santa Fe Railroad at Deerfield, Kans. Electrical energy is transmitted to 23 pumping stations, which are located along a concrete-lined canal 20,000 feet in length. The pumps are connected at 3 of these stations to 12 15-inch wells each and at 20 stations to 9 wells each. All of the features of this plan are completed.

CONSTRUCTION DURING FISCAL YEAR

There has been no construction work in progress during the fiscal year.

OPERATION AND MAINTENANCE

A public notice, dated March 6, 1908, opened for irrigation 10,656 acres of irrigable land. The delivery of water for irrigation was begun on April 1, 1908, from the 10 pumping units then installed, and the other pumping units were utilized as they were installed, in the months of June and July. There was little rainfall and practically no water in the river during the irrigation season of 1908, and the plant was operated almost continuously. The water plane was drawn down

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very low and the discharge from the pumps was, in consequence, materially decreased. The removal of sand from the wells was found to be necessary at frequent intervals. During the season of 1908, 4,885 acres of land were irrigated in part with pumped water. On November 30, 1908, a public notice increasing the charge for the building of the irrigation system to $37.50 was issued. The plant was placed in operation for the season of 1909 on April 5, and water was furnished throughout that season, except when there was considerable rainfall or water was available in the river. By June 30, 1909, 75 certificates, providing water rights for 6,976 acres of irrigable land, had been issued. During the season of 1909, 7,555 acre-feet of water were pumped for use on 6,545 acres of land during an operation period of 96 days and 7 hours. The output of the wells has not been as great as was anticipated, and various causes have combined to make the cost of operation and maintenance high. However, during the irrigation seasons of 1908 and 1909 the operation of the project was fairly successful.

Since 1909 no water has been pumped and maintenance work has been confined to the necessary care of the plant.

SETTLEMENT AND IRRIGATION

The necessarily high cost of pumping water generally renders unprofitable the irrigation of crops grown in large tracts and farmed in accordance with customary methods. On the Garden City project the average size of farms is over 90 acres, and the economy of irrigating holdings of this size is necessarily small. This circumstance and the fact that the rainfall is usually sufficient to secure the maturing of fair crops has apparently lessened the desire of the landowners for an irrigation system, and payment of the Reclamation Service charges as they became due have not been made. During the fiscal year the lands under the project have been farmed to some extent, but without irrigation water except for short periods during the fall of 1910 and spring of 1911, when a flow was obtained from the Arkansas River by direct diversion. Inasmuch as the public notices which have been issued provide that no water shall be furnished in any irrigation season until the operation and maintenance charges of the previous season have been paid, the plant at Garden City has been closed and future operations will depend upon the action of the settlers.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Garden City project

ASSETS

Accounts receivable: Uncollected freight refunds			$69.32
Inventories:			
Equipment in use		$4,046.26	
Storehouse		2,236.35	
Unadjusted transfers		125.00	
			6,407.61
Cost of work:			
Building cost		387,710.70	
Less adjustments	$1,446.40		
Less accrued revenues	8,053.63		
		9,500.03	
			378,210.67
Total assets			384,687.60

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LIABILITIES

Investment of the United States			
Disbursement vouchers	$378,651.21		
Transfer vouchers received	11,135.78		
		$389,786.99	
Collection vouchers	4,616.20		
Transfer vouchers issued	5,140.70		
		9,756.90	
			$380,030.09
Accounts payable:			
Unpaid labor		38.15	
Unpaid purchases		.65	
Unpaid contract holdbacks		3,711.86	
Unpaid freight and express		710.18	
Unpaid passenger fares		196.67	
			4,657.51
Total liabilities			384,687.60

Feature costs to June 30, 1911, Garden City project

Power station:			
Power house and generating machinery, Deerfield, Kans.	$82,463.12		
Power-house accessories	26,710.18		
			$109,173.30
Transmission line and electrical installation (transmission line, pump house, electric lighting, etc.)			15,470.75
Pumping stations:			
Pump houses and pumping units		55,616.23	
Supply wells		53,689.51	
			109,305.74
Canal system:			
Earthwork		59,028.82	
Structures		29,595.63	
			88,624.45
Real estate (rights and property), lands purchased			1,349.23
Buildings:			
Oil house		374.85	
Workshop		730.74	
Headquarters		4,866.87	
			5,972.46
Irrigable lands, farm units, subdivisions			285.66
Preliminary examination, proposed extension of project			7.89
Administration of project as a whole:			
General expense		7,343.60	
United States sugar land litigation		267.23	
			7,610.83
Total building cost			337,800.31
Operation and maintenance (during construction):			
Operation		719.67	
Telephone line		4.19	
Transmission line		9.63	
Power plant		31,235.45	
Power-plant accessories		1,541.75	
Miscellaneous operating charges		11,713.58	
Canal system		3,112.30	
Care of plant during nonuse		1,573.82	
			49,910.39
Total building cost as per debit in cost of work in statement of assets and liabilities			387,710.70

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MONTANA, BLACKFEET (INDIAN) PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Teton.

Townships: 31 to 34 N., Rs. 5 to 10 W.; 29 N., R. 8 W.; 30 N., Rs. 6 to 9 W.; and 35 N., Rs. 6 and 7 W., Montana meridian.

Railroad: Great Northern.

Railroad stations: Browning, Blackfoot, Bombay, Seville, Garnet, Kilroy, Midvale, and Cut Bank, Mont.

Average elevation of irrigable area: 3,850 feet above sea level.

Average annual rainfall on irrigable area: 16 inches.

Range of temperature on irrigable area: −44° to 100°.

WATER SUPPLY

Source of water supply: Two Medicine River, Cut Bank, Badger, Birch, Whitetail, and Blacktail Creeks.

Area of drainage basins: 1,700 square miles.

Annual run-off in acre-feet: Cut Bank Creek at Cut Bank (971 square miles), 1905 to 1910—maximum, 269,000; minimum, 142,000; mean, 216,000. Two Medicine Creek at Family (368 square miles), 1907 to 1910—mean, 368,000. Badger Creek at Family (224 square miles), 1907 to 1910—mean, 187,000. Birch Creek at Dupuyer (155 square miles), 1907 to 1910—mean, 111,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features.]

Reservoirs: Two Medicine Lake—area, 854 acres; capacity, 16,000 acre-feet; length of spillway, 66 feet; elevation of spillway, 30 feet above stream bed. Spring Lake—area, 1,400 acres; capacity, 29,000 acre-feet; length of spillway, 50 feet; elevation of spillway, 45 feet above stream bed. Four Horns—area, 1,867 acres; capacity, 60,640 acre-feet; length of spillway, 50 feet; elevation of spillway, 57 feet above stream bed.

Storage dams: Two Medicine Lake—type, earth embankment with rock-filled log crib and reenforced concrete controlling walls; maximum height, 36 feet; length of crest, 900 feet. Spring Lake—type, earth fill; maximum height, 50 feet; length of crest, 1,500 feet; volume, 75,000 cubic yards. Four Horns—type, earth fill; maximum height, 62 feet; length of crest, 2,225 feet; volume, 149,000 cubic yards.

Diversion dams: For Badger, Birch, and Cut Bank Creeks, not designed. Two Medicine—type, brush and rock; maximum height, 4 feet; length of weir, 165 feet; length of earth fill, 1,000 feet.

Length of canals: 40 miles with capacities greater than 300 second-feet; 144 miles with capacities from 300 to 50 second-feet; 125 miles with capacities less than 50 second-feet.

Dikes: Aggregate length, 800 feet.

Irrigable area: Entire project, 129,000 acres; Two Medicine unit, 48,000 acres; Badger-Fisher unit, 39,500 acres; Cut Bank and Carlow units, 38,000 acres; Birch unit, 3,500 acres.

Present status of irrigable land: All lands on Indian reservation principally allotted to Indians.

RESULTS TO JUNE 30, 1911

Canals: 35 miles with capacities from 50 to 300 second-feet; 25 miles with capacities less than 50 second-feet.

Canal structures: 2 costing over $2,000 each; 4 costing from $500 to $2,000 each; 43 costing less than $500 each.

Bridges: Wood, 7; total length, 139 feet.

Buildings: Office, 1; residence, 1; bunk and mess houses, 7; barns and storehouses, 2.

Roads: 2 miles.

Telephone lines: 59 miles. Telephones in use, 10.

Material excavated: Class 1, earth, 738,417 cubic yards; class 2, indurated material. 30,475 cubic yards; class 3, rock, 60,154 cubic yards.

Riprap: 531 cubic yards.

Cement used: 509 barrels.

Concrete placed: 452 cubic yards.

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AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water season of 1911: None.
Area irrigated, season of 1911: None.
Length of irrigating season: From May 1 to September 30—153 days.
Character of soil of irrigable area: Rich, sandy loam.
Principal products: Hay, grain, and vegetables.
Principal markets: Local and eastern.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. All lands are being irrigated under rental contracts.)

CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys made in 1907.
Construction work on Two Medicine unit begun July, 1908.
Surveys of Two Medicine Lake Dam begun in fall of 1909.
Location surveys of Badger-Fisher unit begun in April, 1911.
Construction work on Badger-Fisher unit begun in June, 1911.
Two Medicine unit 47 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Blackfeet project provides for five irrigation systems on the Blackfeet Indian Reservation, as follows: (1) The Carlow Canal system, heading on the right bank of Cut Bank Creek, and supplying water to about 18,000 acres of land near Carlow Station on the Great Northern Railway; (2) the Cut Bank Canal system, heading on the left bank of Cut Bank Creek, and supplying water to 20,000 acres of land, 11,000 acres of which are outside of the reservation and directly north of the town of Cut Bank; (3) the Two Medicine Canal system, diverting from the left bank of Two Medicine River, and supplying water to 48,000 acres of land; (4) the Badger-Fisher Canal system, diverting from the right bank of Badger Creek, and supplying water to 39,500 acres of land between Birch Creek and Badger Creek; and (5) the Birch Creek Canal system, diverting from Birch Creek, and supplying water to about 3,500 acres of land between Birch and Blacktail Creeks. The irrigable lands of the project are located in general in the southeastern portion of the Blackfeet Indian Reservation, between Cut Bank and Birch Creeks. The only portions of the above irrigation plan which have been completed are the Two Medicine Canal head works, 35 miles of the main canal, and 25 miles of laterals. Construction is in progress upon Two Medicine Lake Dam, the canals and laterals of the Two Medicine unit, and upon the Badger feed canal of the Badger-Fisher unit. The Carlow, Cut Bank, and Birch Creek units of the project remain to be constructed on completion of the Two Medicine and Badger-Fisher units.

CONSTRUCTION DURING FISCAL YEAR

Two Medicine unit.—During the fiscal year surveys and investigations were made at Two Medicine Lake Dam, a construction camp was built, and preparations were made for starting construction.

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Excavation of the main canal and lateral systems was continued, and 21 miles of main canal and 25 miles of laterals were completed. The headworks of the main canal and all the principal structures on the first division were built. On June 30, 47 per cent of the construction work on this unit had been completed.

Badger-Fisher unit.—The construction of the Badger feeder canal was begun in June, 1911, and 66,500 cubic yards of material were excavated before June 30, 1911.

During the year the headquarters of the project were moved from Family, Mont., to Seville, and a warehouse was built at the latter place.

All construction work has been done by force account, principally with Indian labor and teams.

OPERATION AND MAINTENANCE

No water has been delivered for irrigation; but in May an operation force was organized on the Two Medicine unit, and water was turned into the canal for the purpose of priming the first 9 miles.

FINANCIAL STATUS

Feature costs to June 30, 1911, Blackfeet project.

Storage works, Two Medicine Lake Reservoir, examination		$2,636.09
Diversion works:		
Dam surveys	$97.95	
Canal headworks	16,449.54	
		16,547.49
Canal system:		
Main Canal, division 1, Two Medicine unit	238,826.00	
Main Canal, division 2, Two Medicine unit	50,660.60	
South Canal, Two Medicine unit	3,108.02	
Feeder Canal, Badger unit	18,310.34	
		310,904.96
Lateral system:		
Main Canal surveys	11,669.29	
South Canal surveys	2,170.22	
		13,839.51
Spring Lake Reservoir, storage dam survey		1,541.06
Telephone line:		
Construction	4,667.72	
Maintenance	97.02	
		4,764.74
Roads and bridges, construction		2,786.16
Buildings:		
Construction	15,310.50	
Maintenance	1,588.88	
		16,899.38
Administration of project as a whole		3,467.83
Examination of project as a whole:		
Water supply	1,550.46	
Hydrography	2,925.76	
Surveys	3,521.94	
		7,998.16
Inventory of cost, ledger supplies		1,027.94
Total building cost, as per summary in table 20, page 47		382,413.32

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MONTANA, FLATHEAD (INDIAN) PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Flathead, Sanders, and Missoula.
Townships: 15 to 25 N., Rs. 17 to 25 W., Montana meridian.
Railroad: Northern Pacific.
Railroad stations: Evaro, Arlee, Ravalli, Dixon, and Perma, Mont.
Average elevation of irrigable area: 2,800 feet above sea level.
Average annual rainfall on irrigable area: 15 inches.
Range of temperature on irrigable area: −30° to 96°.

WATER SUPPLY

Source of water supply: Flathead, Jocko, and Little Bitter Root Rivers; Mud, Crow, Post, Mission, Dry, Finley, Agency, Big Knife, and Valley Creeks, and about 60 smaller streams.
Area of drainage basin: 8,000 square miles.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoirs: 16; aggregate area, 117,556 acres; aggregate capacity, 1,947,970 acre-feet, as follows: Big Draw—area, 901 acres; capacity, 9,330 acre-feet; length of spillway, 100 feet; elevation of spillway above stream bed, 25 feet. Dog Lake—area, 160 acres; capacity, 3,200 acre-feet; elevation of water surface above stream bed, 30 feet. Dry Fork—area, 250 acres; capacity, 1,918 acre-feet; length of spillway, 100 feet; elevation of spillway above stream bed, 25 feet. Flathead Lake (Newell Dam)—area, 107,000 acres; capacity, 1,800,000 acre-feet; length of spillway, 1,000 feet; elevation of spillway above stream bed, 180 feet. Hubbart—area, 480 acres; capacity, 20,000 acre-feet; length of spillway, 50 feet; elevation of spillway above stream bed, 108 feet. Little Bitter Root Lake—area, 3,000 acres; capacity, 18,000 acre-feet; length of spillway, 20 feet; elevation of spillway above stream bed, 6 feet. Kickinghorse—area, 675 acres; capacity, 6,800 acre-feet; elevation of water surface above stream bed, 23 feet. Lower Crow Creek—area, 300 acres; capacity, 9,485 acre-feet; length of spillway, 100 feet; elevation of spillway above stream bed, 82 feet. McDonald Lake—area, 220 acres; capacity, 10,600 acre-feet; length of spillway, 200 feet; elevation of spillway above stream bed, 51 feet. McConnell—area, 100 acres; capacity, 2,000 acre-feet; elevation of water surface above stream bed, 40 feet. Mission—area, 300 acres; capacity, 3,300 acre-feet; length of spillway, 100 feet; elevation of spillway above stream bed, 74 feet. Ninepipe—area, 1,630 acres; capacity, 15,100 acre-feet; elevation of water surface above stream bed, 30 feet. Pablo—area, 2,100 acres; capacity, 29,600 acre-feet; elevation of water surface above stream bed, 36 feet. Polson—area, 70 acres; capacity, 1,700 acre-feet; elevation of water surface above stream bed, 80 feet. St. Mary Lake—area, 300 acres; capacity, 16,000 acre-feet; length of spillway, 50 feet; elevation of spillway above stream bed, 52 feet. Twin—area, 70 acres; capacity, 937 acre-feet; elevation of water surface above stream bed, 25 feet.

Storage dams: Big Draw—type, earth; maximum height, 35 feet; length of crest, 3,600 feet; volume, 137,000 cubic yards. Dog Lake—type, loose rock and earth; maximum height, 35 feet; length of crest, 2,250 feet; volume, 67,000 cubic yards. Dry Fork—type, earth; maximum height, 33 feet; length of crest, 1,860 feet; volume, 130,000 cubic yards. Hubbart—type, loose rock and earth; maximum height, 118 feet; length of crest, 450 feet; volume, 302,000 cubic yards. Kickinghorse—type, earth; maximum height, 31 feet; length of crest, 3,700 feet; volume, 181,000 cubic yards. Little Bitter Root Lake—type, earth; maximum height, 20 feet; length of crest, 550 feet; volume, 18,000 cubic yards. Lower Crow Creek—type, earth; maximum height, 92 feet; length of crest, 860 feet; volume, 330,000 cubic yards. McConnell—type, earth; maximum height, 45 feet; length of crest, 1,130 feet; volume, 71,000 cubic yards. McDonald Lake—type, loose rock and earth; maximum height, 57 feet; length of crest, 1,500 feet; volume, 214,000 cubic yards. Mission—type, loose rock and earth; maximum height, 80 feet; length of crest, 2,500 feet; volume, 346,000 cubic yards. Newell—type, concrete; maximum height, 170 feet; length of crest, 850 feet; volume, 100,000 cubic yards. Ninepipe—type, earth; maximum height, 38 feet; length of crest, 2,180 feet; volume, 162,000 cubic yards. Pablo—type, earth; maximum height, 46 feet; length of crest, 14,000 feet; volume, 1,028,000 cubic yards. Polson—type, earth; maximum height, 85 feet; length of crest, 1,100

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feet; volume, 170,000 cubic yards. St. Mary Lake—type, loose rock and earth; maximum height, 58 feet; length of crest, 2,200 feet; volume, 140,000 cubic yards. Twin—type, earth; maximum height, 30 feet; length of crest, 1,600 feet; volume, 46,000 cubic yards.

Diversion dams: Rock-filled log-crib type, details not determined.

Length of canals: 14 miles with capacities greater than 300 second-feet; 80 miles with capacities between 300 and 50 second-feet; 800 miles with capacities less than 50 second-feet.

Tunnels: Aggregate length, 2,300 feet.

Water power: None developed. Large amount can be developed from Flathead River and mountain streams.

Irrigable area: 152,000 acres, as follows: Jocko division, 16,000 acres; Mission division, 23,000 acres; Post division, 30,000 acres; Crow division, 14,000 acres; Pablo division, 40,000 acres; Polson division, 6,000 acres; Big Arm division, 3,000 acres; Little Bitter Root division, 15,000 acres; Camas division, 5,000 acres.

Present status of irrigable land: Entered under acts of Congress approved April 23, 1904, and May 29, 1908, 40,000 acres; open to entry, 32,000 acres; withdrawn from entry, none; State lands, 5,000 acres; private lands, 75,000 acres, mostly Indian allotments.

RESULTS TO JUNE 30, 1911

Canals: 2 miles with capacities from 301 to 800 second-feet; 36 miles with capacities from 50 to 300 second-feet; 124 miles with capacities less than 50 second-feet.

Tunnels: Number, 1; total length, 1,333 feet (70 per cent excavated).

Storage dams: Volume, earth, 61,206 cubic yards.

Canal structures: 5 costing over $2,000 each; 16 costing from $500 to $2,000 each; 407 costing less than $500 each.

Bridges: Wood, 74 less than 50 feet in length; total length, 1,319 feet.

Buildings: Offices, 4; residences, 17; barns and storehouses, 10.

Roads: 4 miles.

Telephone lines: 82 miles. Telephones in use: 14.

Material excavated: Class 1, earth, 851,680 cubic yards; class 2, indurated material, 37,251 cubic yards; class 3, rock, 6,905 cubic yards.

Riprap: 2,686 cubic yards.

Paving: 321 square yards.

Cement used: 2,320 barrels.

Concrete placed: 1,768 cubic yards.

AGRICULTURAL CONDITIONS

Area for which water can be supplied, season of 1911: 19,000 acres.

Area irrigated, season of 1911: 2,800 acres.

Length of irrigating season: From May 1 to September 30, 153 days.

Character of soil of irrigable area: Ranges from heavy clay to light sandy loam.

Principal products: Grain, hay, apples, vegetables, small fruits, cattle.

Principal markets: Missoula, Butte, and Anaconda, Mont.; mining and lumber towns and camps.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. All lands are being irrigated under rental contracts.)

CHRONOLOGICAL SUMMARY

Reconnaissance and preliminary surveys made in 1907.

Construction authorized and first appropriation made by act of Congress approved April 30, 1908.

Construction of canals, Jocko division, begun May, 1909.

Construction of Newell Tunnel, Polson division, begun June, 1909.

Construction of feeder canal, Pablo division, begun in 1910.

Construction of feeder canal, Post division, begun in 1911.

June 30, 1911, entire project 15 per cent completed; Jocko division, 67 per cent completed; Mission division, 8 per cent completed; Pablo division, 17 per cent completed; Polson division, 9 per cent completed; Post division, 24 per cent completed; Big Arm division, 10 per cent completed; and Crow, Little Bitter Root, and Camas divisions, preliminary work only.

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IRRIGATION PLAN

The irrigation plan of the Flathead Project provides for the irrigation of about 152,000 acres of land in the Jocko, Mission, Little Bitter Root, and Camas Valleys and on the west shore of Flathead Lake, all in the Flathead Indian Reservation. In the Jocko Valley about 16,000 acres of land will be irrigated by diverting water directly from the Jocko River and its tributaries with few, if any, storage works. In the Mission Valley, which embraces all the territory lying between the Flathead River and the Mission Range from Flathead Lake on the north to St. Ignatius on the south, it is proposed to utilize all the available water from the mountain streams for the irrigation of 113,000 acres of land. The supply from these streams will be stored and regulated by a series of reservoirs and a connecting feeder canal, and will be supplemented by pumping from Flathead River, ample power for which can be developed at Newell Dam. This system includes Mission, Post, Crow, Pablo, and Polson divisions. The Big Arm division, consisting of marginal lands on the west shore of Flathead Lake, will be irrigated with water pumped from Flathead Lake. Power for this pumping will be brought by transmission line from Newell Dam. About 15,000 acres can be irrigated from the waters of Little Bitter Root River and Sullivan Creek, for which adequate storage will be provided by the construction of the Hubbart and Big Draw Reservoirs, and by Little Bitter Root Lake. In the southwestern part of the reservation the flow of Camas and Cottonwood Creeks will be utilized to irrigate 5,000 acres of land.

The following features of the general irrigation plan have been completed: A system of canals taking water from the Jocko River and Big Knife Creek to serve about 8,500 acres; a system of canals, Mission B and its branches, to irrigate about 5,000 acres from Mission Creek; Post B and C Canals to irrigate about 5,500 acres from Post Creek; Ninepipe Dam in Post division to hold about 5,000 acre-feet; also a small feeder canal from Marsh Creek to Ninepipe Reservoir. Polson B Canal has been completed for 5 miles.

Construction is in progress on Jocko, Post, Pablo, and Polson divisions, as follows: On a system of canals taking water from Finley Creek in the southern end of Jocko Valley; on Post B, C, and D Canals and sublaterals taking water from Ninepipe Reservoir for about 17,000 acres and on the 400 second-foot Kickinghorse feeder canal to fill both Ninepipe and Kickinghorse Reservoirs; on the Pablo feeder canal, capacity 300 second-feet, which is the main gathering and distributing canal of the project, collecting all the streams of the Mission Valley, distributing the water along its length and discharging the surplus into the Pablo Reservoirs; on the distributing canals of Pablo Reservoir; on the South Pablo Dam; and on Newell Tunnel at the power site.

The principal works to be constructed in the future are the following: In Jocko Valley, extension of the canal system from the Jocko River to cover lands south of the river, new canals taking water from Valley and Revais Creeks and one or two more from Jocko River, in all covering about 5,000 acres. In Mission Valley and Big Arm divisions the construction of St. Mary, McDonald, Kickinghorse, Mission, Twin, Pablo, Polson, Crow, and McConnell Reservoirs; feeder canals for McConnell, St. Mary, Twin, and Polson

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Reservoirs; and canal systems to cover the remaining lands, about 89,000 acres; the installation of hydroelectric and pumping machinery after completion of Newell Tunnel; and a power transmission line and canal system for lake shore lands. In Little Bitter Root and Camas divisions—Little Bitter Root Lake, Big Draw, Dry Fork, Hubbart, and Dog Lake Reservoirs; a long canal from Little Bitter Root River; and various lesser canals from the other streams and reservoirs named to cover about 20,000 acres.

CONSTRUCTION DURING FISCAL YEAR

Jocko division.—Work was completed by the middle of July, 1910, on an extension of the North Side Canal from Jocko River and the new canal from Big Knife Creek.

Pablo division.—On Pablo feeder canal 10½ miles of 300 to 200 second-foot section were excavated with a 30-ton steam shovel on traction wheels, and 7 miles were excavated by grader and scrapers. Heavy timber covering 12 miles of this line was cleared off and the logs were sawed for construction lumber. A system of lateral canals was built covering about 4,500 acres below Pablo Reservoir, and work is well advanced on the concrete controlling works for the South Pablo Dam and on a series of five concrete drops in the feeder canal. A construction headquarters camp has been built adjoining Flathead town site.

Post division.—The Ninepipe Dam has been constructed to hold 5,000 acre-feet of water—one-third final capacity. This is earth fill, with face covered with heavy quarry stone. Controlling works are completed for the larger dam. Canal systems are completed below the dam to irrigate about 5,500 acres, to be extended later. A 45-ton steam shovel was installed in April, 1911, and has excavated 3 miles of feeder canal for Ninepipe and Kickinghorse Reservoirs. Clearing of this line was completed during the year. Concrete and log crib headworks were built on Post Creek during the winter.

Polson division.—Work on Newell Tunnel has been continued with three shifts, handwork, throughout the year. The heading has been advanced 853 feet, making a total of 1,333 feet to June 30, 1911. This tunnel will be 1,800 feet long and will have a horseshoe shaped cross section 9 feet 9 inches wide and 9 feet high. During the fiscal year about 660,000 cubic yards of material was handled in excavation for the canals and dams.

OPERATION AND MAINTENANCE

During the season of 1910 water was turned into canals and delivered to Indian lands wherever the owners asked for it, but accurate records were not made as to the amount handled. About 1,000 acres in Jocko divison and about 500 acres in Mission division received water, a total of about 50 farms being irrigated. Use of water was delayed until much of the possible benefit was lost. During part of the winter a small force was employed in riprapping slopes, extending and modifying drops, and other protection work. During the season of 1911 irrigation began in Jocko division on June 16 and in Mission division on June 15. Prior to June 30, 1,432 acre-feet of water had been turned into the canals, and 464 acre-feet were delivered to farms. Much of the loss is due to the gravelly soil of the

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Jocko Valley and the relatively small use compared with the length of canal. Heavy rains, 2.73 inches in May and 4.37 inches in June, account for the light irrigation in the early part of the season. Five hundred and twenty-seven acres have received water to June 30, and about 2,800 acres of land are under rental contract to receive water during the year.

SETTLEMENT AND IRRIGATION

The reservation was formally opened to settlement on May 2, 1910. In general, the land is nearly all entered except the 40-acre tracts laid out as farm units which are without natural water supply.

One town site located near Camas Hot Springs and one on the Big Arm of Flathead Lake have been selected and approved. Irrigation in 1910 was begun too late to secure best results, some postponing irrigating until the grain was burned. A few farmers, who began irrigating early, secured excellent results. During the early part of 1911 heavy rains delayed irrigation but at the close of the rainy season irrigation was begun in good season in Jocko Valley and to a less extent in Mission Valley. It is believed that lands now irrigated will give excellent grain crops.

PRINCIPAL CURRENT CONTRACT

The following statement contains data relating to the principal contract completed during the fiscal year ending June 30, 1911: No. 321; date, April 13, 1910; contractor, Atlantic Equipment Co.; for steam shovel; estimated value, $6,900; estimated earnings, June 30, 1911, $7,160; completion due, May 20, 1910.

FINANCIAL STATUS

Feature costs to June 30, 1911, Flathead project

Headquarters:		
Buildings and grounds	$7,212.38	
Telephone system	5,782.95	
		$12,995.33
Jocko division:		
Survey and design	21,173.85	
Canal system—		
Excavation	44,401.89	
Structures	15,241.08	
Headworks	6,075.06	
Lateral system—		
Excavation	11,778.23	
Structures	2,145.05	
Building and grounds, construction	3,301.15	
Bridges and roads	638.06	
Gaging streams	2,137.62	
		106,891.99
Mission division:		
Survey and design	12,674.84	
Canal system—		
Excavation	12,124.27	
Structures	1,252.56	
Headworks	4,490.44	
Lateral system—		
Excavation	1,763.21	
Structures	1,779.43	
Buildings and grounds, construction	1,347.49	
Bridges and roads	856.88	
Gaging streams	1,521.50	
		37,810.62

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Polson division:		
Survey and design	$5,874.87	
Canal system, excavation	5,588.33	
Buildings and grounds, construction	8,888.26	
Bridges and roads—		
Power plant road	1,476.89	
Shaft camp road	1,719.31	
Roads, general	132.47	
Gaging streams	1,297.28	
Storage works, reservoir	1,356.62	
Newell Tunnel—		
Sinking shaft	4,461.76	
Driving tunnel	61,759.35	
Dam	350.00	
Power plant, plant construction	7,343.91	
Pumping station, plant construction	805.12	
		$101,054.17
Little Bitter Root division, survey and design, preliminary		2,627.11
Camas division, survey and design, preliminary		469.61
Post division:		
Survey and design	30,614.34	
Canal system—		
Excavation	36,822.41	
Structures	14,877.87	
Headgates	15,515.30	
Lateral system, excavation	5,574.37	
Buildings and grounds, construction	195.89	
Bridges and roads	2,764.74	
Gaging streams	1,119.03	
Storage works—		
Dam	36,339.13	
Outlet	10,797.85	
		154,620.93
Crow division, survey and design, preliminary		8,337.87
Pablo division:		
Survey and design	36,636.57	
Canal system—		
Excavation	91,463.66	
Structures	14,467.32	
Lateral system—		
Excavation	6,716.70	
Structures	542.30	
Storage works, reservoir	8,652.33	
Buildings and grounds, construction	5,195.79	
Bridges and roads	2,356.28	
		166,030.95
Inventory of cost ledger supplies		6,299.27
Total building cost, as per summary in table 20, page 47		597,137.85

MONTANA, FORT PECK (INDIAN) PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Valley.
Townships: 26 to 33 N., Rs. 40 to 55 E., Montana meridian.
Railroad: Great Northern.
Railroad stations: Wiota, Kintyre, Frazer, Oswego, Lohmiller, Wolf Point, Macon, Chelsea, Poplar, Sprole, Brockton, Calais, and Blair, Mont.
Average elevation of irrigable area: 2,000 feet above sea level.
Average annual rainfall on irrigable area: 13 inches.
Range of temperature on irrigable area: −40° to 100°.

WATER SUPPLY

Source of water supply: Missouri and Poplar Rivers, Big Porcupine, Little Porcupine, Wolf, Smoke, and Big Muddy Creeks.
Area of drainage basins: Missouri River, 85,000 square miles; Poplar River, 3,000 square miles.

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DATA FOR COMPLETE PROJECT [1]

[Including only Little Porcupine unit and first division of Poplar River unit]

LITTLE PORCUPINE UNIT

Storage reservoir: Area, 390 acres; capacity, 3,900 acre-feet.
Storage dam: Type, earth with brush mattress on slopes; volume, 32,600 cubic yards of earth; 9,400 square yards brush mattress.
Diversion dam: Little Porcupine—type, concrete weir on rock-filled timber crib base; maximum height, 4 feet; length, 150 feet.
Length of canals: 1 mile with capacity from 50 to 300 second-feet; 13 miles with capacity of less than 50 second-feet.

POPLAR RIVER UNIT

Diversion dam B Canal: Type, concrete weir on rock-filled timber crib base; maximum height, 4 feet; length, 300 feet.
Length of canal: 11 miles with capacity over 50 second-feet; 22 miles with capacity less than 50 second-feet.
Poplar River C Canal: 5 miles of canal with capacity of 100 second-feet.
Dike: Length, 700 feet.
Irrigable area: Entire project, 128,000 acres.
Present status of irrigable land: Indian allotments, 90,685 acres; unallotted reservation lands, 30,815 acres; not included in reservation, 6,500 acres.

RESULTS TO JUNE 30, 1911

Canals: 17 miles with capacities from 50 to 300 second-feet; 35 miles with capacities less than 50 second-feet.
Storage dams: Volume, 34,000 cubic yards of earth.
Canal structures: 7 costing over $2,000 each; 2 costing from $500 to $2,000 each; 3 costing less than $500 each.
Bridges: Combination, 1; length, 38 feet.
Buildings: Offices, 1; residences, 5; barns and storehouses, 5.
Material excavated: Class 1, earth, 400,000 cubic yards.
Cement used: 913 barrels.
Concrete placed: 936 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: Little Porcupine unit, 2,500 acres; Poplar River unit, 5,000 acres.
Area irrigated, season 1911: None.
Length of irrigating season: From April 1 to August 15—137 days.
Character of soil of irrigable area: Heavy clay and loam.
Principal products: Hay, grain, and vegetables.
Principal markets: Local.

LANDS OPENED FOR IRRIGATION

Pending the opening of the reservation, the area to be furnished with water consists of the Indian allotments. The work of allotting has been practically completed and the irrigable areas allotted in each unit are as follows: Big Porcupine, 2,420 acres; Little Porcupine, 2,025 acres; Missouri gravity canal, 64,480 acres; Poplar River, 8,400 acres; Big Muddy, 13,360 acres.

CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys made in 1908.
Construction work on Little Porcupine unit begun September, 1909.
Construction work on Poplar River system begun September, 1910.
Little Porcupine unit 98 per cent completed June 30, 1911.

[1] Design of structures for Big Porcupine, Missouri gravity canal, Big Muddy units and remaining divisions of Poplar River unit not definitely determined.

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IRRIGATION PLAN

The irrigation plan of the Fort Peck project provides, in so far as the water supply is found sufficient, for the irrigation of lands in various parts of the Fort Peck Indian Reservation and adjacent territory, as follows: (1) 4,000 acres in the vicinity of Wiota Station, with flood water supply from the Big Porcupine Creek; (2) 2,500 acres in the vicinity of Frazer, with water supply from Little Porcupine Creek, conserved by storage; (3) 20,000 acres in the vicinity of Poplar and extending along Poplar River, a distance of about 35 miles, with water supply from Poplar River, conserved by storage below the forks of Poplar River and West Branch; (4) 15,000 acres lying along the west side of Big Muddy Creek, with water supply from Big Muddy Creek, conserved by storage on Smoke and Wolf Creeks; (5) 50,000 acres of clear bench land and approximately 25,000 acres of brush and timber land extending along the Missouri River, with water supply from the Missouri River by a gravity canal heading near the site of old Fort Peck; (6) 2 tracts of approximately 6,000 acres each, adjacent to and above the gravity canal, that can be irrigated by pumping from the Fort Peck Canal with lifts of 12 and 20 feet, respectively.

The features of the above irrigation plan which have been completed are the Little Porcupine unit, which irrigated 2,500 acres and the first division of the Poplar River unit to irrigate 5,000 acres of land.

Construction is in progress upon the Poplar River unit canals and laterals and upon the small structures of the Little Porcupine unit, which will be completed in July, 1911. There remain to be constructed the following units: Big Porcupine, Big Muddy, Missouri Gravity Canal, and the remaining divisions of Poplar unit.

CONSTRUCTION DURING FISCAL YEAR

Little Porcupine unit.—This unit, construction of which was begun in September, 1909, was completed on June 30, 1911, with the exception of a few of the smaller structures, which are to be completed in July, 1911.

Poplar River unit.—Construction of the first two divisions of this unit, consisting of the B or West Side Canal and the C or East Side Canal, was begun in September, 1910. The work involved the construction of a rock-filled timber-crib diversion dam with concrete weir and abutment, maximum height 4 feet, and length 300 feet, 2 concrete outlet structures, 2 flumes of 73 second-feet capacity, 16 miles of canal with capacity of over 50 second-feet, and complete lateral system with 22 miles of canal less than 50 second-feet, to irrigate 5,000 acres of land under the B Canal. On June 30, 1911, 269,000 cubic yards of earth in canals and laterals had been excavated with Indian labor and teams. The diversion dam was completed on June 10, and at the end of the fiscal year the B Canal and half of the laterals and structures had been completed, and work was in progress upon the C Canal.

Camp construction.—Temporary camp buildings were constructed 16 miles north of Poplar, Mont., consisting of an office, messhouse, 4 bunk houses, mercantile store, storehouse, and stable. A warehouse was built at Poplar on the siding of the Great Northern Railway.

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Surveys.—During the fiscal year topographic surveys were made in the Poplar River valley and the area west of Big Muddy Creek, covering 75 square miles. Canal location was begun on the B and C Canals from Poplar River.

Work will be suspended on this project in August, 1911, as no allotment of funds has been made for continuing the work at the present time.

FINANCIAL STATUS

Feature costs to June 30, 1911, Fort Peck project

Surveying and designing:		
Galpin division	$2,973.34	
Milk River division	3,199.20	
Frazer division	4,429.63	
Oswego division	3,740.24	
Wolf Point division	2,905.83	
Chelsea division	2,519.04	
Big Muddy division	104.00	
		$19,871.28
Camps:		
Construction	1,516.78	
Maintenance	1,171.94	
		2,688.72
Water supply, Oswego division		649.17
Gaging stations:		
Galpin division	74.04	
Milk River division	110.93	
Frazer division	110.95	
Oswego division	508.75	
		804.67
Tunnels:		
No. 1 Frazer division (preliminary expense)	938.97	
No. 2 Frazer division (preliminary expense)	952.40	
		1,891.37
Little Porcupine unit:		
Survey and design	2,389.89	
Diversion dam and head gates	7,315.29	
Feed canal	5,189.05	
Crossing under Great Northern Ry	3,430.36	
Small embankment	2,779.92	
Large embankment	6,263.61	
Outlet structures, concrete	2,439.13	
Distributing system (excavation and structures)	19,318.99	
		49,126.24
Poplar River unit:		
Survey and design	6,523.48	
Poplar River Dam	6,198.56	
Canal B, west side—		
Head gates	1,329.03	
Excavation	32,269.70	
Structures	3,642.37	
Distribution	7,880.16	
Structures	181.09	
Canal C, east side—		
Head gates	1,935.56	
Excavation	33,459.37	
Structures	22.50	
Distribution	55.04	
Camp maintenance	2,853.87	
Gaging streams	172.18	
Building (temporary) and grounds	4,055.90	
		100,578.81
Administration of project as a whole, general expense		3,710.81
Inventory of cost ledger supplies		1,114.00
Total building cost as per summary in Table 20, page 47		180,435.07

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MONTANA, HUNTLEY PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Yellowstone.
Townships: 2 and 3 N., Rs. 27 to 31 E., Montana meridian.
Railroads: Northern Pacific; Chicago, Burlington & Quincy.
Railroad stations: Huntley, Osborn, Worden, Newton, Pompeys Pillar, Bull Mountain, Ballantine, and Anita, Mont.
Average elevation of irrigable area: 3,000 feet above sea level.
Average annual rainfall on irrigable area: 12 inches.
Range of temperature on irrigable area: −35° to 100°.

WATER SUPPLY

Source of water supply: Yellowstone River.
Area of drainage basin: 12,000 square miles.
Annual run-off in acre-feet of Yellowstone River at Huntley (12,000 square miles), 1904 to 1910: Maximum, 7,040,000; minimum, 4,590,000; mean, 5,800,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoirs, dikes, and dams: None.
Length of canals: 9.5 miles with capacities greater than 300 second-feet; 19 miles with capacities from 300 to 50 second-feet; 256 miles with capacities less than 50 second-feet.
Tunnels: 3; aggregate length, 2,654 feet.
Water power: Estimated total, 600 horsepower; 286 net horsepower developed.
Irrigable area: Entire project, 32,405 acres.
Present status of irrigable land: Entered subject to the reclamation act, 20,646 acres; open to entry, 4,967 acres; in private ownership, 3,192 acres; 3,600 acres withdrawn from entry.

RESULTS TO JUNE 30, 1911

Canals: 9.5 miles with capacities from 301 to 800 second-feet; 19 miles with capacities from 50 to 300 second-feet; 241 miles (including 76 miles of drainage ditches), with capacities less than 50 second-feet.
Tunnels: 3; total length, 2,654 feet.
Canal structures: 22 costing over $2,000 each; 21 costing from $500 to $2,000 each; 2,200 costing less than $500 each.
Bridges: Combination, 131 less than 50 feet in length; total length, 1,962 feet.
Buildings: Offices, 1; residences, 11; barns and storehouses, 11; pump house, 1.
Telephone lines: 23 miles. Telephones in use: 10.
Material excavated: Class 1, earth, 1,443,000 cubic yards; class 2, indurated material 15,200 cubic yards; class 3, rock, 10,000 cubic yards.
Riprap: 740 cubic yards.
Cement used: 15,000 barrels.
Concrete placed: 11,300 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 28,805 acres.
Area irrigated, season of 1911: 12,000 acres.
Length of irrigating season: From May 1 to September 30—153 days.
Character of soil of irrigable area: Ranges from heavy clay to light sandy loam.
Principal products: Alfalfa, oats, barley, potatoes, sugar beets.
Principal markets: Billings, Mont.; St. Paul and Minneapolis, Minn.; Denver, Colo.; Kansas City, Mo.

LANDS OPENED FOR IRRIGATION

Dates of public notices: May 21, 1907, March 3, 1909.
Location of lands opened: Ts. 2 and 3 N., Rs. 27 to 31 E., Montana meridian.
Present status of irrigable lands opened: 20,646 acres entered subject to the reclamation act; 4,967 acres open to entry; 3,192 acres in private ownership.

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Limit of area of farm units: 160 acres.
Duty of water: 2½ acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $30.
Annual operation and maintenance charge: $0.60 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance made and preliminary surveys begun in 1904.
Construction authorized by Secretary April 18, 1905.
First irrigation by Reclamation Service, season of 1908.
Main unit completed in 1908.
Entire project 96 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Huntley project provides for the diversion of water from the south side of Yellowstone River, about 2 miles above Huntley, Mont., into a main canal, which extends down the valley about 27 miles to the vicinity of Bull Mountain; the greater part of the water is distributed by gravity through a system of laterals, and a small portion is pumped into a high-line canal and thence distributed through laterals for irrigation. The power for pumping is developed at a 34-foot drop in the main canal, 14 miles below the gates, where water for the high-line canal is elevated 45 feet by turbine-driven centrifugal pumps.

In the project as at present developed the main canal extends as far as Lost Boy Creek, the high-line canal extends to Fly Creek, and at the pumping plant two units are installed which deliver 56 second-feet to the high-line canal. Practically all construction work on this original development was completed in 1908. Construction of a 6-mile extension of the main canal and a 9-mile extension of the high-line canal will be undertaken during the coming year, thus completing the project.

CONSTRUCTION DURING FISCAL YEAR

No construction work was in progress during the fiscal year ending June 30, 1911, but plans have been prepared for the extension of the main and high-line canals during the ensuing year. The main canal will be extended 6 miles east to a point about 2 miles east of the town site of Bull Mountain, on the Northern Pacific Railway. This extension will cover approximately 1,800 acres of land lying along the south bank of the Yellowstone River, all of which can be irrigated by gravity. The high line will be extended a distance of 9 miles, to cover about 1,800 acres lying in the lower part of Fly Creek Valley and on the bench immediately above the main canal adjacent to Pompey's Pillar. Water can be delivered to most of the farm units under these extensions direct, only a few short distributaries being necessary.

OPERATION AND MAINTENANCE

During the operating season of 1910, which lasted from April 27 to October 1, the entire system, including 175 miles of canals and 67 miles of drainage ditches, and 350 farm units, aggregating 8,000 acres, were irrigated. Approximately 15,800 acre-feet of water was delivered to the farm lands.

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During the present season 12,000 acres are being irrigated. The principal maintenance work has consisted of repairs, clearing of canals, and installing of checks and turnouts and a system of weirs and measuring devices. The cost of operation for the year 1910 was $5,000, and of maintenance, $10,000.

SETTLEMENT AND IRRIGATION

During the fiscal year 72 new farm units were entered, covering an irrigable area of 3,174 acres. The population on the farms is now over 1,300. The principal crops grown are oats, wheat, alfalfa, sugar beets, and potatoes. In 1910 the average yield of alfalfa, including first-year crop, was 5 tons to the acre, with a maximum of 8 tons. The oats crop averaged about 25 bushels to the acre, but this included a large area of new land on which the yield was very small. Land cultivated the preceding year yielded 40 to 90 bushels to the acre. Sugar beets were one of the most profitable crops, with an average yield of 10.5 tons per acre, and average returns of $62.44 per acre. On lands previously cropped, alfalfa gave returns of $40 to $60 per acre, and sugar beets $75 to $110.

Of the 12,000 acres being irrigated in 1911, 3,500 acres are planted to sugar beets, 3,500 to small grains, 3,000 to alfalfa, 1,400 to other forage crops, and 300 each to corn and potatoes.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Huntley project

ASSETS

Accounts receivable:			
Uncollected water right building charges		$45,599.16	
Uncollected water right operation and maintenance charges		942.22	
			$46,541.38
Inventories:			
Government animals		2,170.00	
Equipment in use		10,629.92	
Storehouse		140.29	
Cement		2,191.56	
Fuel		57.84	
Local products		24.65	
Unadjusted transfers		2,302.68	
			17,517.14
Cost of work:			
Building cost		843,468.32	
Less accrued revenues		8,120.94	
			835,347.38
Operation and maintenance cost		135,619.73	
Less accrued revenues		1,619.80	
			133,999.93
Total assets			1,033,405.83

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$1,063,543.03		
Transfer vouchers received	37,783.58		
		1,101,326.61	
Collection vouchers	159,867.13		
Transfer vouchers issued	87,986.72		
		247,853.85	
			853,472.76

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Accounts payable:		
Unpaid labor	$4,388.27	
Unpaid purchases	640.26	
Unpaid freight and express	464.92	
Unpaid passenger fares	145.90	
		$5,639.35
Repayments accrued:		
Building	145,095.01	
Operation and maintenance	29,198.71	
		174,293.72
Total liabilities		1,033,405.83

Feature costs to June 30, 1911, Huntley project

Main canal and high-line canal:		
Excavation	$381,242.41	
Structures	87,079.64	
Railroad bridges and culverts	5,470.66	
		$473,792.71
Distributing system:		
Earthwork and structures	238,125.26	
Pumping plant, 34-foot drop, main canal	71,975.75	
Pryor Creek improvement	19,297.79	
		329,398.80
Canal extension:		
Surveys	6,236.79	
Camps, construction	300.37	
		6,537.16
Real estate (rights and property), lands purchased		1,027.52
Buildings and grounds, construction		17,627.58
Telephone line, construction		9,041.01
Supplemental construction		5,986.94
Inventory of building cost ledger supplies		56.60
Total building cost		843,468.32
Operation and maintenance:		
Main canal	34,560.37	
Lateral system	83,952.13	
Structures	3,150.69	
Pumping plant	8,771.52	
Buildings and grounds	1,985.16	
Telephone system	219.91	
Demonstration farm	2,261.97	
		134,901.75
Inventory of operation and maintenance cost ledger supplies		717.98
Total operation and maintenance cost		135,619.73
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		979,088.05

MONTANA, MILK RIVER PROJECT[1]

LOCATION AND CLIMATIC CONDITIONS

Counties: Teton, Valley, and Chouteau.

Townships: 34 to 37 N., R. 14 W., T. 34 N., R. 15 W., T. 37 N., Rs. 11 to 13 W., Ts. 27 to 33 N., Rs. 17 to 42 E., Montana meridian.

Railroad: Great Northern.

Railroad stations: Browning, Havre, Chinook, Harlem, Dodson, Malta, Saco, Hinsdale, and Glasgow, Mont.

Average elevation of irrigable area: 2,200 feet above sea level.

Average annual rainfall on irrigable area: 13 inches.

Range of temperature on irrigable area:—45° to 103°.

[1] Milk River project includes St. Mary storage unit, described in previous reports as a separate project.

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WATER SUPPLY

Source of water supply: St. Mary Lakes, Swift Current Creek, and Milk River.

Area of drainage basin: St. Mary Lakes and Swift Current Creek, 292 square miles; Milk River at Havre, 7,000 square miles; Milk River at Malta, 14,000 square miles; Milk River at Hinsdale, 19,600 square miles.

Annual run-off in acre-feet of Milk River: At Havre (7,000 square miles), 1898 to 1910—Maximum, 424,000; minimum, 17,400; mean, 219,000. At Malta (14,000 square miles), 1903 to 1910—Maximum, 675,000; minimum, 29,400; mean, 305,000. Of St. Mary River: At Babb (177 square miles), 1902 to 1910—Maximum, 535,000; minimum, 305,000; mean, 430,000. At international line (452 square miles), 1903 to 1910—Maximum, 1,220,000; minimum, 511,000; mean, 770,000.

SUMMARY OF DATA FOR COMPLETE PROJECT

Reservoirs: Upper St. Mary Lake—area, 4,546 acres; capacity, 151,000 acre-feet; length of spillway, 500 feet; elevation of spillway, 43 feet above stream bed. Lower St. Mary Lake—area, 3,746 acres; capacity, 67,000 acre-feet; length of spillway, 500 feet; elevation of spillway, 31 feet above stream bed. Chain Lakes—area, 13,422 acres; capacity, 437,560 acre-feet; length of spillway, 1,000 feet; elevation of spillway, 75 feet above stream bed. Nelson Lake—area, 6,842 acres; capacity, 190,430 acre-feet; length of spillway not determined.

Storage dams: Upper St. Mary Lake—type, earth fill; maximum height, 51 feet; length of crest, 4,960 feet; volume, 450,000 cubic yards. Lower St. Mary Lake—type, earth fill; maximum height, 40 feet; length of crest, 2,600 feet; volume, 156,000 cubic yards. Chain Lakes—type, earth fill; maximum height, 92 feet; length of crest, 2,210 feet; volume, 1,728,000 cubic yards. Nelson Lake—type, earth fill; maximum height, 33 feet; length of crest, 15,135 feet; volume, 911,540 cubic yards.

Diversion dams: Swift Current Creek—type and length not determined. Chinook—type and length not determined; height, 14 feet. Dodson—type, rock fill timber crib with automatic crest; maximum height, 26 feet; length, 318 feet, 7 inches. Vandalia—type, reenforced concrete; height, 27 feet; length, 300 feet.

Length of canals: St. Mary storage unit—26 miles with capacity of 850 second-feet. Dodson division—42 miles with capacities greater than 800 second-feet; 60 miles with capacities from 50 to 300 second-feet; 110 miles with capacities less than 50 second-feet. Nelson Reservoir division (including Vandalia Canal)—90 miles with capacities from 50 to 300 second-feet; 130 miles with capacities less than 50 second-feet.

Tunnels: St. Mary storage unit, 1; length, 1,170 feet. Chain Lakes Reservoir outlet, 1; length, 465 feet.

Aggregate length of dikes: Dodson division (constructed), 22,700 feet.

Irrigable area: Entire project, 207,600 acres. (Dodson division, first unit, 10,000 acres.)

Present status of irrigable land: 43,602 acres entered subject to the reclamation act; 26,675 acres withdrawn from entry; 9,623 acres State land; 96,700 acres private land; 31,000 acres Indian land.

SUMMARY OF RESULTS TO JUNE 30, 1911

ST. MARY STORAGE UNIT

Bridges: Number, 8; total length, 200 feet.

Buildings: Offices, 2; residences, 4; barns and storehouses, 4; sawmill, 1.

Roads: 65 miles.

Telephone lines: 25 miles. Telephones in use: 3.

Material excavated: Class 1, earth, 275,441 cubic yards; class 2, indurated material, 4,681 cubic yards; class 3, rock, 51,078 cubic yards.

DODSON DIVISION, MILK RIVER UNIT

Canals: 8 miles with capacities more than 800 second-feet; 12 miles with capacities from 50 to 300 second-feet; 26 miles with capacities less than 50 second-feet.

Diversion dams: Volume—masonry, 163 cubic yards; earth, 5,900 cubic yards; rock fill, 10,650 cubic yards.

Dikes or levees for protection from overflow: Total length, 22,700 feet; volume, 119,500 cubic yards.

Canal structures: Costing over $2,000 each, 6; costing from $500 to $2,000 each, 3; costing less than $500 each, 225.

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Bridges: Number, 27; total length, 719 feet.
Buildings: Mess houses, 3; bunk houses, 6; barns and storehouses, 5.
Roads: 2 miles.
Telephone lines: (Rented.) Telephones in use: 5. (Rented.)
Material excavated: Class 1, earth, 912,481 cubic yards; class 2, indurated material, 7,438 cubic yards; class 3, rock, 4,411 cubic yards.
Riprap: 4,410 cubic yards.
Paving: 1,113 square yards.
Cement used: 2,154 barrels.
Concrete placed: 1,646 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season 1911: 7,800 acres.
Area irrigated, season of 1911: 2,000 acres.
Length of irrigating season: From March 15 to September 15—185 days.
Character of soil of irrigable area: Sandy loam and gumbo.
Principal products: Alfalfa, hay, grain, and vegetables.
Principal markets: Minneapolis and St. Paul, Minn.; local.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. Two thousand acres are being irrigated under rental contracts.)

CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys begun by the Reclamation Service in 1902.
Construction authorized by Secretary March 14, 1903.
Construction of St. Mary storage unit authorized by Secretary March 25, 1905.
Construction begun July 27, 1906.
Dodson Diversion Dam completed in January, 1910.
Treaty with Great Britain relating to distribution between Canada and the United States of the waters of St. Mary and Milk Rivers signed January 11, 1909, and proclaimed May 13, 1910.
First unit under Dodson South Canal 85 per cent completed June 30, 1911.
Entire project 12 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Milk River project provides for the storage of water in St. Mary Lakes by means of a dam at the outlet of lower St. Mary Lake and its diversion through a canal 27 miles long, heading at the reservoir and discharging into the North Fork of Milk River thence flowing through Canada for 100 miles or more and returning to the United States; the storage of water in a reservoir at Chain Lakes on Milk River about 12 miles northeast of Burnham, Mont., and in Nelson Lake Reservoir south of Milk River near Malta; the discharge of stored water into Milk River as required; the diversion of water from Milk River by dams near Chinook into four canals, two on each side of the river, for the irrigation of lands near Chinook and Harlem, comprising the Chinook division; the diversion of water from Milk River by a dam near Dodson into two canals, one on each side of the river, for the irrigation of lands near Dodson, Malta, Bowdoin, and Ashfield, comprising the Dodson division; and the irrigation of lands on both sides of Milk River in the vicinity of Saco, Hinsdale, Vandalia, Tampico, and Glasgow, known as the Nelson Reservoir division, by water stored in Nelson Reservoir and delivered to lands through the Nelson Reservoir north and south canals or returned to Milk River for subsequent diversion at Vandalia Dam into the Vandalia Canal on both sides of the river, watering lands in the vicinity of Glasgow.

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The features of the above irrigation plan which have been completed are: The Dodson Diversion Dam to the height of the fixed crest; Dodson Canal headworks; 8 miles of the Dodson South Canal, which will ultimately be 42 miles in length; Point of Rocks Equalizing Reservoir; and Foothill and River Laterals supplying water to about 7,800 acres of land above Malta.

There is no construction work in progress at present.

The features remaining for future construction are the St. Mary storage works and diversion canal; the Chain Lakes and Nelson Lake Reservoirs; the Chinook, Nelson Reservoir, and Vandalia divisions, and the completion of the distributing system for the Dodson division.

The right to the use of river channels in Canada and an equitable division of the waters of St. Mary and Milk River drainage basins, are secured by a treaty between the United States and Canada, signed January 11, 1909, and proclaimed May 13, 1910. The treaty provides:

* * * The St. Mary and Milk Rivers and their tributaries (in the State of Montana and the Provinces of Alberta and Saskatchewan) are to be treated as one stream for the purposes of irrigation and power, and the waters thereof shall be apportioned equally between the two countries, but in making such equal apportionment more than half may be taken from one river and less than half from the other by either country so as to afford a more beneficial use to each. It is further agreed that in the division of such waters during the irrigation season, between the 1st of April and 31st of October, inclusive, annually, the United States is entitled to a prior appropriation of 500 cubic feet per second of the waters of the Milk River, or so much of such amount as constitutes three-fourths of its natural flow, and that Canada is entitled to a prior appropriation of 500 cubic feet per second of the flow of St. Mary River, or so much of such amount as constitutes three-fourths of its natural flow.

The channel of the Milk River in Canada may be used at the convenience of the United States for the conveyance, while passing through Canadian territory, of waters diverted from the St. Mary River. * * *

The measurement and apportionment of the water to be used by each country shall from time to time be made jointly by the properly constituted reclamation officers of the United States and the properly constituted officers of His Majesty under the direction of the international joint commission.

CONSTRUCTION DURING FISCAL YEAR

Three factors have contributed to delaying construction work on the Milk River project during past years: First, the necessity of an adjustment of water rights on the St. Mary and Milk Rivers as between the United States and Canada, which difficulty was disposed of by treaty proclaimed May 13, 1910; second, water rights which have been filed under the State laws of Montana, and are held by the people who are to be benefited by the expenditures from the reclamation fund for the construction of this project, remain unadjusted, and for this reason construction work during the fiscal year has not been started. Negotiations are being directed toward an early adjustment of this matter by contract between the owners of private lands and ditches and the Secretary of the Interior, after which construction work will be resumed and carried forward as rapidly as practicable.

St. Mary Diversion Canal.—The excavation on the first few miles of the canal, begun in August, 1909, and which was in progress on June 30, 1910, was continued until December 3, 1910, when winter weather caused a suspension of work. About 35,000 cubic yards of

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material were excavated during the fiscal year. The work was not resumed in the spring, due to the contemplated relocation of a part of the canal in a more stable location on the opposite or west bank of St. Mary River.

Dodson South Canal lateral system.—At the beginning of the fiscal year works were completed for the irrigation of 7,800 acres of the 10,000 acres of land under the first unit and proposals were opened October 21, 1910, for excavation of lateral and waste-water ditches for the remaining 2,200 acres, but the prices were deemed excessive and only one small contract was awarded. This work involved about one-third of the yardage advertised and was the only construction work completed during the year.

Preliminary work.—Plans and specifications have been prepared covering canals and structures, first half of Dodson north unit, and also for the extension of the Dodson South Canal from Alkali Creek to the divide, about 4 miles east of Malta. In addition to the necessary engineering work connected with the above features, location work has been continued on Bowdoin Canal, which branches from the Dodson South Canal at the Malta divide and also the upper portion of the Vandalia Canal, which delivers water to the Vandalia-Glasgow unit.

OPERATION AND MAINTENANCE

During the season of 1910 no lands were irrigated on the project, as the entire flow of the river had been diverted above the Dodson Dam. This condition will be obviated in future by the construction of storage works.

During the season of 1911 about 2,000 acres of land are being irrigated under 24 rental contracts. Delivery of water began April 19, and up to June 30, 1,148 acre-feet of water had been delivered. In order to divert water into the Dodson Canal, a temporary crest is placed on the top of the dam after the ice goes out in the spring, raising the water about 2½ feet and providing for the diversion of about 200 second-feet of water. On June 30, 1911, 1,500 second-feet of water was flowing over the Dodson Dam.

SETTLEMENT AND IRRIGATION

No progress has been made in settlement, as public notice announcing the opening of the project has not yet been issued. Water is being delivered to private lands on a rental basis.

The crops irrigated consist mostly of small grains, alfalfa, native hay, and vegetables. These crops are in excellent condition, and it is believed that very good yields will be obtained.

PRINCIPAL CURRENT CONTRACT

The following statement contains data relating to the principal contract completed during the fiscal year ending June 30, 1911: No. 319, date March 14, 1910; contractor, Des Moines Bridge & Iron Works; for highway bridges; estimated value, $1,082; estimated earnings, June 30, 1911, $1,082; completion due May 6, 1910.

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Milk River project

ASSETS

Accounts receivable: Uncollected miscellaneous rentals			$60.00
Inventories:			
Mercantile store		$731.37	
Government animals		2,998.35	
Equipment in use	$32,793.51		
Less depreciation	891.68		
		31,901.83	
Storehouse		30,052.33	
Freight and handling undistributed		189.81	
			65,873.69
Cost of work:			
Building cost	853,293.13		
Plus adjustments	5,347.38		
		858,640.51	
Less adjustments	1,266.68		
Less accrued revenues	2,412.52		
		3,679.20	
			854,961.31
Total assets			920,895.00

LIABILITIES

Investment of the United States:			
Disbursement vouchers	897,915.26		
Transfer vouchers received	58,773.88		
		956,689.14	
Collection vouchers	13,422.09		
Transfer vouchers issued	31,779.06		
		45,201.15	
			911,487.99
Accounts payable:			
Unpaid labor		2,195.58	
Unpaid purchases		1,494.16	
Unpaid contract estimates		2,375.63	
Unpaid contract holdbacks		345.74	
Unpaid freight and express		1,485.51	
Unpaid passenger fares		188.20	
Unredeemed meal tickets		28.65	
Unpaid miscellaneous		1,293.54	
			9,407.01
Total liabilities			920,895.00

Feature costs to June 30, 1911, Milk River project

ST. MARY STORAGE UNIT

Distributing system, main canal			$117,644.57
Buildings, construction			18,003.73
Real estate (rights and property), lands purchased			14,253.75
Roads and highways:			
Browning, St. Mary		$11,918.58	
Sawmill, canal		604.37	
Cardston		3,977.28	
			16,500.23
Telephone line, construction			1,747.79
Coal mine, development			2,593.90
Waterworks, construction			1,465.33

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Examination of unit:		
Hydrography	$4,338.23	
Surveys	34,606.85	
Topography (Blackfeet Indian Reservation)	1,702.57	
		$40,647.65
Administration of unit, general expense		42,944.40
Inventory of cost ledger supplies		486.91
Total building cost		256,288.26

MILK RIVER UNIT

Diversion works:		
Dodson Dam	110,305.29	
South headworks	13,230.49	
Dike, headworks	11,259.14	
		134,794.92
Canal system:		
South Main Canal, Dodson	204,851.02	
South Canal distributing system	74,977.37	
Main Canal, Vandalia	5,509.02	
North Main Canal, Dodson	9,061.59	
Main Canal, Bowdoin	1,891.02	
Canal distributing system, Bowdoin	2,190.33	
North Canal distributing system, Dodson	2,106.18	
Canal distributing system, Vandalia	1,205.35	
		301,791.88
Real estate (rights and property), lands purchased		10,534.44
Buildings, construction, Dodson unit		7,029.09
Operation and maintenance, during construction		2,723.61
Examination of unit:		
Hydrography	16,451.38	
Surveys	36,782.17	
		53,233.55
Administration of unit, general expense		86,591.27
Inventory of cost ledger supplies		306.11
Total building cost		597,004.87
Total building cost as per debit in cost of work in statement of assets and liabilities		853,293.13

MONTANA, SUN RIVER PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Teton, Lewis and Clark, Choteau, Cascade.
Townships: 20 to 25 N., Rs. 3 E. to 8 W., Montana meridian.
Railroad: Great Northern.
Railroad stations: Vaughn, Power, Dutton, and Collins, Mont.
Average elevation of irrigable area: 3,700 feet above sea level.
Average annual rainfall on irrigable area: 12 inches.
Range of temperature on irrigable area: −40° to 100°.

WATER SUPPLY

Source of water supply: Sun River and tributaries, Deep Creek, and Bowl Creek.

Area of drainage basins: Sun River, 1,070 square miles; Deep Creek, 260 square miles; Bowl Creek, 9 square miles.

Annual run-off, in acre-feet, 1905–1910: North Fork of Sun River, near Augusta; maximum, 786,000; minimum, 339,000; mean, 633,000. Willow Creek, near Augusta; maximum, 35,300; minimum, 7,900; mean, 19,500. Sun River, at Sun River; maximum, 1,140,000; minimum, 380,000; mean, 828,000. South Fork of Sun River; maximum, 139,000; minimum, 20,800; mean, 72,600.

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DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoirs: Willow Creek—Area, 2,696 acres; capacity, 86,000 acre-feet; length of spillway, 200 feet; elevation of spillway, 100 feet above stream bed. Warm Springs—Area, 1,976 acreas; capacity, 156,800 area-feet; length of spillway, 150 feet; elevation of spillway above stream bed, 180 feet. Pishkun—Area, 1,542 acres; capacity, 45,700 acre-feet. Benton Lake—Area, 9,130 acres; capacity, 140,200 acre-feet.

Storage dams: Willow Creek—type, earth fill; maximum height, 110 feet; length of crest, 1,045 feet; volume, 437,000 cubic yards. Warm Springs—type, rock and hydraulic fill; maximum height, 190 feet; length of crest, 762 feet; volume, 1,056,600 cubic yards. Benton Lake—type, earth fill; maximum height, 35 feet; length of crest, 120 feet; volume, 12,000 cubic yards. Pishkun—type, earth fill; maximum height, 48 feet; length of crest, 2,300 feet; volume, 439,000 cubic yards.

Diversion dams: Canyon—type, reenforced concrete weir; maximum height, 72 feet; length of crest, 150 feet; volume, 6,800 cubic yards. Deep Creek—type, reenforced concrete weir; maximum height, 12 feet; length of crest, 100 feet; volume, 500 cubic yards.

Length of canals: Fort Shaw unit—0.3 mile with capacities greater than 300 second-feet; 18 miles with capacities from 300 to 50 second-feet; 99 miles with capacities less than 50 second-feet. Remainder of project: 134 miles surveyed, with capacities greater than 300 second-feet; smaller canals not located.

Tunnels: Number, 7; aggregate length, 12,600 feet.

Dikes: Number, 5; aggregate length, 22,000 feet.

Irrigable area: Entire project about 180,000 acres; Fort Shaw unit, 16,346 acres.

Present status of irrigable lands (entire project): 50,000 acres entered subject to the reclamation act; 2,433 acres open to entry; 82,567 acres withdrawn from entry; 15,000 acres of State lands, and 30,000 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 18 miles with capacities from 50 to 300 second-feet; 99 miles with capacities less than 50 second-feet.

Tunnels: Number, 1; length, 525 feet.

Storage dams: Earth; volume, 108,000 cubic yards.

Canal structures: 6 costing more than $2,000 each; 6 costing from $500 to $2,000 each; 594 costing less than $500 each.

Bridges: Steel, 8 with lengths less than 50 feet, total length 225 feet; combination, 1, length, 60 feet; wood, 11 with lengths less than 50 feet, total length 397 feet; total length of all bridges, 682 feet.

Buildings: Offices, 4; residences, 10; barns and storehouses, 13.

Roads: 1 mile.

Telephone lines: 65 miles; telephones in use, 16.

Material excavated: 643,401 cubic yards of class 1, earth; class 2, indurated material, 20,737 cubic yards; class 3, rock, 4,244 cubic yards; wet, 23,589 cubic yards; puddle, 6,724 cubic yards.

Riprap: 5,310 cubic yards.

Paving: 714 square yards.

Cement used: 5,239 barrels.

Concrete placed: 4,417 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 16,346 acres.

Area irrigated, season of 1911: 7,170 acres.

Length of irrigating season: From May 15 to October 15, 153 days.

Character of soil of irrigable area: Sandy loam, clay, adobe, and alluvium.

Principal products: Hay, grain, and vegetables.

Principal markets: Great Falls, Helena, and Butte, Mont.

LANDS OPENED FOR IRRIGATION

Dates of public notices: March 26, 1908; November 19, 1910; March 28, 1911.

Location of lands opened: Ts. 20 and 21 N., Rs. 1 to 3 W., Montana meridian.

Present status of irrigable lands opened: 10,819 acres entered subject to the reclamation act; 2,434 acres open to entry; 377 acres of State lands; 1,984 acres in private ownership.

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Limit of area of farm units: 160 acres.
Duty of water: 2 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $30.
Annual operation and maintenance charge: $0.50 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance made and preliminary surveys begun in 1905.
Construction authorized by Secretary February 26, 1906.
Fort Shaw Main Canal completed July, 1908.
First irrigation by Reclamation Service, season of 1909.
Fort Shaw unit completed December, 1909.
Willow Creek Dam 62 per cent completed June 30, 1911.
Whole project 8 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Sun River project provides for the storage of water in the Warm Springs Reservoir on the North Fork of the North Fork of Sun River, in the Willow Creek Reservoir on Willow Creek, in Pishkun Reservoir north of Sun River, and in Benton Lake Reservoir, 8 miles north of Great Falls, Mont.; the diversion of water from South Fork of North Fork of Sun River through a supply canal into Warm Springs Reservoir; the diversion of water from the North Fork of Sun River through supply canals into Willow Creek and Pishkun Reservoirs; the diversion of flood waters of Deep Creek into the Benton Lake Reservoir; the diversion of water from Bowl Creek, a tributary of Flathead River, on the west side of the Continental Divide through a canal 1½ miles in length into the North Fork of the North Fork of Sun River; the diversion of water from Sun River, supplemented by stored water released from Warm Springs and Willow Creek Reservoirs, into a canal system watering lands mainly in the abandoned Fort Shaw Military Reservation; the diversion of water from Pishkun Reservoir into a high-line canal supplying water for lands in the Sun River Valley; the diversion of water from Deep Creek, supplemented by stored water released from Pishkun Reservoir; and for the lower lands of the system by stored water released from Benton Lake Reservoir, into a canal system supplying water to the lands in the Sun and Teton River Valleys.

The Fort Shaw unit of the project is completed, and work is in progress upon the construction of the Willow Creek Dam. Preliminary location surveys have been made for all the main canals of the proposed north side work. Diamond drilling is in progress at the site of the proposed canyon diversion dam. Topographic surveys have been made of the irrigable lands on the proposed Teton slope unit; for the proposed increased capacities of the Pishkun and Willow Creek Reservoirs; and in connection with the adjudication of water rights on Sun River. A decree determining these rights was signed by the judge of the district court June 14, 1911.

CONSTRUCTION DURING FISCAL YEAR

Willow Creek Dam.—This dam is being constructed by force account, and for the present will be built to a height of only 70 feet. It is of earth fill type, and the base, or about 60 per cent of the total yardage, has been placed by steam shovel and dinkies. Excavation was begun with the steam shovel on September 1, 1910, and has con-

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tinued to the date of this report with the exception of three months during the extremely cold weather and a month for repairs. On June 17 wagons were substituted for the dinkies and cars on account of the nonuniformity of material and the steep grade from pit to dam. All material when placed has been well sprinkled and rolled, and every precaution exercised for future stability. Four cut-off trenches were excavated to bed rock beneath the base of the dam, through 4 feet of the loam, 4 feet of sand and gravel, and about 2 feet of blue clay overlying bed rock. The trenches were dug by teams and then back filled and puddled with selected material. Both abutments were thoroughly stripped of vegetable matter. The diversion tunnel, 4 feet 6 inches in diameter, and the gate shaft, constructed of reenforced concrete, were completed in 1907. The intake to the tunnel was also constructed in 1907, and the diffusion chamber was built in the fall of 1910. The upper face of the dam has been riprapped with heavy bowlders picked up in the vicinity of the dam and laid as fast as work on the dam progressed. On June 30, 1911, there were 2,000 acre-feet of water in Willow Creek Reservoir. It is expected that the 70-foot dam, with crest elevation of 4,140 feet above sea level and with a storage capacity at elevation 4,130 of 16,000 acre-feet, will be completed by November 1, 1911.

OPERATION AND MAINTENANCE

On the Fort Shaw unit during the season of 1910 the entire canal system, including 105 miles of canals and laterals, was in operation, and 120 farm units, aggregating 4,077 acres of land, were irrigated. No stored water was available, but the supply received from the river was sufficient for all requirements. The irrigation season opened April 12 and closed October 5. Approximately 30,500 acre-feet of water was diverted and 9,700 acre-feet was delivered to the land, the balance being partly lost by seepage and evaporation, but mainly wasted in carrying a full head of water for a few irrigators. A small maintenance force was employed in riprapping, building checks and turnouts, and cleaning ditches. The season of 1911 opened May 15, and 7,170 acres of land are being irrigated.

SETTLEMENT AND IRRIGATION

During the past year settlement has progressed gradually on the Fort Shaw unit until, on June 30, 1911, there were left open to entry only about 2,400 acres of irrigable land. On April 1, 1911, 1,200 acres of land originally comprised in the Fort Shaw Indian School Reserve was subdivided into 17 farm units and opened to entry. Of the total 17 units, 9 were entered and 8 were still open to entry on June 30, 1911. In this tract of 1,200 acres 845 acres were classed as irrigable. In the two townsites on the Fort Shaw unit, Sims and Fort Shaw, portions of which have been placed on the market, sales of lots have progressed during the past year until, on June 30, 1911, half of the 66 lots were sold. The population on the farms is more than 850.

Crop results on the irrigated land during the season of 1910 were fairly satisfactory, considering that many of the farmers were late in planting seed, and practically all of the water users were inexpe-

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rienced in irrigating. The average yields were 25 bushels of oats per acre, 18 bushels of wheat, and 100 bushels of potatoes.

The main crops planted in 1911 were oats, wheat, alfalfa, and potatoes, and the outlook at the end of the fiscal year is very promising for a good yield.

PUBLIC NOTICE, DATED NOVEMBER 19, 1910

In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), notice is hereby given, as follows:

1. Water will be ready for irrigation during the season of 1911 of the lands in sections 11, 14, and 23, T. 20 N., R. 2 W., Fort Shaw unit, Sun River project, Montana, as shown on the plat of the said township approved by the Acting Secretary, September 12, 1910, and on file in the local land office at Great Falls, Mont.

2. Homestead entries, accompanied by applications for water rights and the first installment of the charges for building, operation, and maintenance, may be made on and after April 1, 1911, beginning at 9 o'clock a. m., under the provisions of said act, for the farm units shown within the said sections.

3. Warning and notice are hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun prior to April 2, 1911, on any land within the said sections, and all such settlement or occupation is hereby forbidden.

4. The limit of area per entry, representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family on the lands entered subject to the provisions of the reclamation act, is fixed at the amounts shown upon the plat for the several farm units.

5. The charges which shall be made for each acre of irrigable land in the said entries are in two parts, as follows:

(*a*) The building of the irrigation system, $30 per acre of irrigable land, payable in not more than 10 annual installments, each payment not less than $3, or some multiple thereof, per acre. Full payment may be made at any time of any balance of the building charge remaining due after certification by the Commissioner of the General Land Office that full and satisfactory compliance has been shown with all of the requirements of the law as to residence, cultivation, and reclamation.

(*b*) For operation and maintenance for the season of 1911, and annually thereafter until further notice, 50 cents per acre of irrigable land, whether water is used thereon or not. As soon as the data are available the operation and maintenance charges will be fixed in proportion to the amount of water used, with a minimum charge per acre of irrigable land whether water is used thereon or not.

6. All entries made hereafter for any of the lands described, whether for lands not heretofore entered or for lands covered by prior entries which have been canceled by relinquishment or otherwise, shall be accompanied by applications for water rights in due form, and by the first installment of the charges for building, operation, and maintenance, not less than $3.50 per acre of irrigable land. The second installment of the building charge, not less than $3 per acre, and the appropriate charge for operation and maintenance shall be due on March 1, 1912. Subsequent installments of the building charge shall become due on March 1 of each year thereafter until fully paid.

7. The regulation is hereby established that no water will be furnished in any year until the portions for operation and maintenance of all installments then due shall have been paid. Accordingly no water will be furnished in the irrigation season of 1912 for any lands, unless the portion for operation and maintenance of the installment due March 1, 1912, has been paid; and in like manner no water will be furnished in any subsequent irrigation season unless payment has been made of the portions of the installments for operation and maintenance then due and unpaid.

8. Failure to pay any two installments of the charges when due shall render the entries subject to cancellation, with the forfeiture of all rights under the reclamation act, as well as of any moneys already paid.

9. All charges must be paid at the local land office at Great Falls, Mont.

10. The charges may, for the convenience of applicants, be paid to the special fiscal agent of the United States Reclamation Service assigned to the Fort Shaw unit for transmission to the register and receiver of the local land office on or before the date specified for payment at the local land office, but, in case this privilege is availed of, the necessary charges for transportation of the cash, as determined by the special fiscal agent, must accompany the payment of the water-right charges.

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ORDER DATED MARCH 28, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section four of the Reclamation Act and for other purposes," the following order is promulgated for the purpose of relieving the present situation on the Fort Shaw unit, Sun River project, Montana, pending the issuance of public notice modifying or abrogating the notices heretofore issued.

2. Action looking to the cancellation of entries and water-right applications for failure to make payments when due shall be deferred until December 1, 1911, and water will be furnished in the irrigation season of 1911 in all cases where payment is made on or before April 30, 1911, of all operation and maintenance charges which have heretofore become due and remain unpaid.

PRINCIPAL CURRENT CONTRACT

The following statement contains data relating to the principal contract completed during the fiscal year ending June 30, 1911: No. 321; date, April 13, 1910; contractor, Atlantic Equipment Co., for steam shovel; estimated value, $6,900; estimated earnings, June 30, 1911, $7,160; completion due, May 20, 1910.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Sun River project

ASSETS

Accounts receivable:			
Uncollected water rentals		$71.88	
Uncollected miscellaneous rentals		149.15	
Uncollected miscellaneous		62.97	
Uncollected water-right building charges		48,307.56	
Uncollected water-right operation and maintenance charges		4,620.20	
			$53,211.76
Inventories:			
Mercantile store		374.68	
Government animals		9,973.68	
Equipment in use	$34,389.16		
Less depreciation	1,475.96		
		32,913.20	
Storehouse		8,201.08	
Cement		543.76	
Lumber		1,676.89	
Forage		2,501.18	
Fuel		1,135.63	
Cash in office safe		85.19	
			57,405.29
Cost of work:			
Building cost		739,400.74	
Less adjustments	5,221.88		
Less accrued revenues	6,294.76		
		11,516.64	
			727,884.10
Operation and maintenance cost		36,526.57	
Less accrued revenues		508.15	
			36,018.42
Total assets			874,519.57

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$783,103.38		
Transfer vouchers received	50,437.67		
		833,541.05	
Collection vouchers	55,861.32		
Transfer vouchers issued	9,186.38		
		65,047.70	
			868,493.35

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Accounts payable:		
Unpaid labor	$4,699.20	
Unpaid purchases	1,626.94	
Unpaid freight and express	1,977.78	
Unpaid passenger fares	21.95	
Unpaid miscellaneous	217.50	
		$8,543.37
Repayments accrued:		
Building	84,487.17	
Operation and maintenance	12,995.68	
		97,482.85
Total liabilities		874,519.57

Feature costs to June 30, 1911, Sun River project

Storage works:		
Willow Creek Dam	$136,317.44	
Willow Creek outlet tunnel	17,030.11	
Willow Creek, driving and timbering shaft	9,510.19	
		$162,857.74
Diversion works:		
Canal headworks	17,610.01	
Spillway at headworks	1,031.52	
		18,641.53
Canal system:		
Main Canal—		
Division No. 1	91,415.31	
Simms Creek Siphon	36,759.20	
Division No. 2	46,554.96	
Willow Creek Supply Canal	215.41	
Lateral system	202,543.80	
		377,488.68
Telephone system: Construction		6,195.46
Real estate: Lands purchased		16,274.94
Irrigable lands: Farm units, subdivision		1,950.47
Buildings: Construction		22,980.60
North side surveys:		
Camp construction	1,907.86	
Camp maintenance	284.80	
Surveys, topography, etc., including undistributed balance	93,102.35	
		95,295.01
Plant accounts: Operative accounts		3,457.70
Administration of project as a whole: General expense		25,386.48
Examination of project as a whole: Hydrography		8,542.06
Inventory of cost ledger supplies		330.07
Total building cost		739,400.74
Operation and maintenance:		
Main Canal	8,159.10	
Lateral A	7,140.37	
Lateral C	2,890.04	
Lateral D	1,755.18	
Laterals C5, K, and H	5,447.37	
Miscellaneous structures	1,793.78	
Buildings	286.90	
Telephone system	1,624.79	
Administration (undistributed)	31.81	
Publicity and settlement	5,428.61	
Instruction and demonstration	1,968.62	
		36,526.57
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		775,927.31

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MONTANA-NORTH DAKOTA, LOWER YELLOWSTONE PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Dawson, Mont.; McKenzie, N. Dak.
Townships: 18 to 26 N., Rs. 56 to 60 E., Montana meridian; 150 to 152 N., R. 104 W., fifth principal meridian.
Railroads: Northern Pacific; Great Northern.
Railroad stations: Glendive and Mondak, Mont.
Average elevation of irrigable area: 1,900 feet above sea level.
Average annual rainfall on irrigable area: 16 inches.
Range of temperature on irrigable area: −36° to 108°.

WATER SUPPLY

Source of water supply: Yellowstone River.
Area of drainage basin: 66,000 square miles.
Annual run-off in acre-feet of Yellowstone River at Glendive (66,100 square miles) 1903 to 1910: Maximum, 13,300,000; minimum, 8,500,000; mean, 10,800,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features.]

Diversion dam: Type, rock-filled timber weir; maximum height, 12 feet; length of crest, 700 feet; volume, 9,017 cubic yards.
Length of canals: 49 miles with capacities greater than 300 second-feet; 19 miles with capacities from 300 to 50 second-feet; 191 miles with capacities less than 50 second-feet.
Dikes: Aggregate length, 35,600 feet.
Water power: Estimated total, 290 horsepower. None developed.
Irrigable area: Entire project, 60,116 acres; first unit, 40,638 acres; extensions 19,478 acres.
Present status of irrigable lands (entire project): 13,378 acres entered subject to the reclamation act; 4,612 acres open to entry; 1,644 acres of State lands; 40,482 acres in private ownership (including railroad lands).

RESULTS TO JUNE 30, 1911

Canals: 49 miles with capacities from 301 to 800 second-feet; 19 miles with capacities from 50 to 300 second-feet; 127 miles with capacities less than 50 second-feet.
Diversion dams: Volume, 9,017 cubic yards of rock fill.
Dikes or levees for protection from overflow: Total length, 35,600 feet; volume, 138,276 cubic yards.
Canal structures: 38 costing more than $2,000 each; 47 costing from $500 to $2,000 each; 918 costing less than $500 each.
Bridges: Steel—15 with lengths of 50 feet or more, 16 with lengths of less than 50 feet, total length, 1,474 feet; combination—6 with lengths of less than 50 feet, total length, 141 feet; Wood—1 with a length of more than 50 feet, 132 with lengths of less than 50 feet, total length, 1,580 feet.
Buildings: Offices, 4; residences, 14; barns and storehouses, 17.
Roads: 11 miles.
Telephone lines: 78 miles. Telephones in use, 29.
Material excavated: Class 1, earth, 6,190,841 cubic yards; class 2, indurated material, 182,733 cubic yards; class 3, rock, 189,111 cubic yards.
Riprap: 17,285 cubic yards.
Cement used: 26,268 barrels.
Concrete placed: 21,202 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 40,638 acres.
Area irrigated, season of 1911: 21,817 acres.
Length of irrigating season: From May 15 to October 15, 153 days.
Character of soil of irrigable area: Deep sandy loam; some gumbo.
Principal products: Grain, forage crops, and vegetables.
Principal markets: Minneapolis and St. Paul, Minn.; local.

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LANDS OPENED FOR IRRIGATION

Dates of public notices and orders: December 21, 1908; April 24, 1909; March 7, 1911; March 27, 1911; and May 1, 1911.
Location of lands opened: Ts. 18 and 19 N., R. 57 E., Ts. 19 and 20 N., R. 58 E.; Ts. 21 to 25 N., R. 59 E.; T. 24 N., R. 60 E., Montana meridian. T. 150 N., R. 104 W.; T. 151 N., R. 104 W., fifth principal meridian.
Present status of irrigable lands opened: 6,525 acres entered subject to the reclamation act; 1,459 acres open to entry; 1,504 acres of State lands; 31,150 acres in private ownership.
Limit of area of farm units: Public, 80 acres; private, 160 acres.
Duty of water: 2½ acre-feet per annum per acre at the farm.
Building charge per acre of irrigable land: $42.50 and $45.
Annual operation and maintenance charge: $1 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance made and preliminary surveys begin in 1903.
Construction authorized by Secretary May 10, 1904.
Main Canal: 61 miles completed March, 1909.
Yellowstone Dam completed February 19, 1910.
First irrigation by Reclamation Service, season of 1909.
Entire project 95 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Lower Yellowstone project provides for the diversion of water from the Yellowstone River, at a point 18 miles below Glendive, Mont., into a canal on the west side of the river, which extends down the valley a distance of 67 miles to the confluence of the Yellowstone and Missouri Rivers, and which conveys water for the irrigation of land lying between it and the Yellowstone River.

The fall of the water discharged from the Main Canal into Lateral KK, at a point 19 miles below the headworks, will be utilized in operating turbines direct connected to centrifugal pumps, for raising water to irrigate approximately 3,000 acres of bench land.

The features which have been completed are the Lower Yellowstone Dam and diversion works; the Main Canal for a distance of 61 miles; and the complete lateral system connected therewith, excepting a few sublaterals and extensions of main laterals. The only construction work in progress consists of the completion of the unfinished portions of the lateral system as the needs of water users require. The features for future completion are the pumping plant, the remaining 6 miles of the Main Canal, and about 63 miles of laterals which, when completed, will irrigate approximately 20,000 acres.

CONSTRUCTION DURING FISCAL YEAR

The only construction work in progress during the year was in connection with the extension of the lateral system, excavation of drains, and reconstruction of special features. The principal work consisted of raising the dam and dike 3 feet at the Burns Creek crossing on the Main Canal, the partial reconstruction of Lateral DD, the excavation of Drain B, and construction of 3 sublaterals. This work involved the handling of 18,000 cubic yards of earth.

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OPERATION AND MAINTENANCE

During the season of 1910, from May 14 to October 4, the diverting works, 61 miles of main canal, and 127 miles of laterals were operated, and 97 farm units, aggregating 8,655 acres of land, were irrigated. There were 54,982 acre-feet of water diverted at the Lower Yellowstone Dam, and 12,501 acre-feet delivered for irrigation. Due to ice gorges in the river and other causes extensive repairs to the canal system were necessary in the spring, most of the work being done by contract. During the present season no serious difficulty has arisen in the operation of the canals. On June 30, 1911, applications had been received for water for 18,375 acres of land.

SETTLEMENT AND IRRIGATION

Practically all irrigable land on the Lower Yellowstone project is filed upon, and in anticipation of the completion this fall of the Missouri River Railway from Glendive to Sidney, Mont., the price of land is firm with an upward tendency. The towns Savage, Sidney, and Fairview, situated 35, 54, and 65 miles below Glendive, have 150, 350, and 200 inhabitants, respectively. Sidney has two banks, and the other towns one each. The population on the farms in the project is estimated at more than 1,800. The towns of Intake, at the diversion works, Burns, 10 miles below, Savage, Sears, Newlon, and Sidney will be stations on the new railroad line.

During the season of 1910 the landowners who used water systematically and in time secured good crops. Land that was irrigated in 1910 shows to a marked advantage this year over the nonirrigated tracts, the grain being better and stronger in every way. The estimated value of the crops in 1910 was $129,825 or an average of $15 per acre.

The irrigable area of land subscribed for water this season remaining unseeded amounts to about 2,400 acres. Of the seeded area, wheat predominates, occupying approximately 50 per cent of the acreage, oats 20 per cent, flax 15 per cent, alfalfa 10 per cent, and timothy about 5 per cent. There is a small acreage in barley and corn. All the farmers have planted more or less garden truck and all crops seem to be further advanced and in better condition than during the previous year.

ORDER DATED MARCH 7, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public, No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section four of the reclamation act, and for other purposes," the following order is promulgated for the purpose of relieving the present situation on the Lower Yellowstone project, pending the issue of public notice modifying or abrogating the notices heretofore issued.

2. A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment will become effective as to all water-right applications subject to public notices heretofore issued upon the payment of $1.50 per acre on or before March 31, 1911, subject, however, to compliance with the conditions of a public notice to be hereafter issued making a building charge which shall be between $53 and $55 per acre. Such stay of proceedings shall remain in effect until further announcement by means of a public notice or otherwise. Water will also be furnished for the year 1911 to others, upon the filing with the project engineer of proper applications subject to the terms of this order and upon the payment of the sum of $1.50 per acre under the conditions herein provided. No water will be furnished

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Lower Yellowstone project

ASSETS

Accounts receivable:			
Uncollected freight refunds		$27.58	
Uncollected miscellaneous		10,519.34	
Uncollected water-right building charges		96,759.49	
Uncollected water-right operation and maintenance charges		13,122.94	
			$120,429.35
Inventories:			
Government animals		4,272.50	
Equipment in use		10,160.09	
Storehouse		1,680.31	
Cement		2,059.20	
Lumber		793.69	
Cash in office safe		5,833.21	
Local products		492.20	
Freight and handling undistributed		1,472.97	
			26,764.17
Cost of work:			
Building cost	$2,771,672.15		
Plus adjustments	6,498.85		
		2,778,171.00	
Less adjustments	167.95		
Less accrued revenues	27,962.44		
		28,130.39	
			2,750,040.61
Operation and maintenance cost			186,008.74
Total assets			3,083,242.87

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$2,929,574.57		
Transfer vouchers received	75,553.86		
		3,005,128.43	
Collection vouchers	61,965.76		
Transfer vouchers issued	20,720.67		
		82,686.43	
			2,922,442.00
Accounts payable:			
Unpaid labor		4,433.19	
Unpaid purchases		450.75	
Unpaid contract holdbacks		13,832.11	
Unpaid freight and express		10.84	
Unpaid land agreements		949.46	
Unpaid miscellaneous		7,559.09	
			27,235.44
Repayments accrued:			
Building		108,081.49	
Operation and maintenance		25,483.94	
			133,565.43
Total liabilities			3,083,242.87

Feature costs to June 30, 1911, Lower Yellowstone project

Diversion works: Lower Yellowstone Dam			$325,109.09
Canal system:			
Earthwork		$1,415,010.62	
Structures		577,774.09	
			1,992,784.71
Distribution system:			
Earthwork		214,251.83	
Structures		20,886.86	
			235,138.69

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Highway bridges:		
Bridge No. 3	$8,643.69	
Bridges, force account	2,959.06	
Bridges, schedule No. 1	22,561.79	
Bridges, schedule No. 2	22,357.82	
Wooden structures, headworks to Newlon	14,002.42	
Approaches	4,275.98	
		$74,800.76
Real estate		28,696.21
Buildings:		
Construction	17,895.32	
Maintenance	266.71	
		18,162.03
Telephone system:		
Construction	19,184.50	
Maintenance	4,532.82	
		23,717.32
Irrigable lands:		
Land surveys	12,450.01	
Soil surveys	1,890.55	
Farm units	1,016.24	
		15,356.80
Examination of project as a whole:		
Reconnoissance	20,442.76	
Surveys	30,009.98	
		50,452.74
Administration of project as a whole:		7,453.80
Total building cost		2,771,672.15
Operation and maintenance:		
Main canal earthwork	52,854.68	
Main canal structures	19,004.33	
Lateral system	54,037.42	
Demonstration farms	8,805.38	
Telephone system	6,900.95	
Real estate	720.15	
Buildings and grounds	35,366.37	
Administration charges	8,319.46	
		186,008.74
Total building and operation and maintenance cost as per debit in cost of work in statement of assets and liabilities		2,957,680.89

NEBRASKA-WYOMING, NORTH PLATTE PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Sioux, Scotts Bluff, Banner, and Morrill, Nebr.; Natrona, Carbon, Converse, and Laramie, Wyo.

Townships: 19 to 27 N., Rs. 48 to 67 W.; 26 to 30 N., Rs. 83 to 85 W., sixth principal meridian.

Railroads: Chicago, Burlington & Quincy; Union Pacific; Chicago & Northwestern; Colorado & Southern.

Railroad stations: Bridgeport, Bayard, Minatare, Scottsbluff, Mitchell Morrill, an Henry, Nebr.; Torrington, Vaughn, Lingle, Barnes, Fort Laramie, Whalen, Guernsey, and Caspar, Wyo.

Average elevation of irrigable area: 4,100 feet above sea level.

Average annual rainfall on irrigable area: 15 inches.

Range of temperature on irrigable area: −25° to 104°.

WATER SUPPLY

Source of water supply: North Platte River.

Area of drainage basin: 12,000 square miles.

Annual run-off in acre-feet of North Platte River: At Pathfinder, Wyo., (12,000 square miles), 1905 to 1910—maximum, 2,420,000; minimum, 870,000; mean, 1,470,000. At Whalen, Wyo., (16,200 square miles), 1900 to 1910—maximum, 2,690,000; minimum, 985,000; mean, 1,690,000.

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DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features.]

Reservoirs: Pathfinder—area, 21,774 acres; capacity, 1,025,000 acre-feet; length of spillway, 660 feet; elevation of spillway, 182 feet above stream bed. Reservoir No. 1—area, 900 acres; capacity, 14,200 acre-feet; length of spillway, 100 feet; elevation of spillway, 18 feet above stream bed. Reservoir No. 2—area, 1,005 acres; capacity, 28,000 acre-feet; length of spillway 100 feet; elevation of spillway, 51 feet above stream bed. Reservoir No. 3—area, 2,240 acres; capacity, 67,025 acre-feet; length of spillway, 100 feet; elevation of spillway, 55 feet above stream bed.

Storage dams: Pathfinder—type, broken range cyclopean rubble-masonry arch; maximum height, 218 feet; length of crest, 432 feet; volume, 60,210 cubic yards. Dam No. 1—type, earth; maximum height, 28 feet; length of crest, 3,100 feet; volume, 167,000 cubic yards. Dam No. 1½—type, earth; maximum height, 22 feet; length of crest, 2,250 feet; volume, 83,000 cubic yards. Dam No. 2—type, earth; maximum height, 65 feet; length of crest, 4,100 feet; volume, 700,000 cubic yards. Dam No. 3—type, earth; maximum height, 65 feet; length of crest, 3,370 feet; volume, 570,000 cubic yards.

Diversion dams: Whalen—type, concrete weir; maximum height, 29 feet; length of masonry, 300 feet; length of earth fill,2, 200 feet; volume, 80,740 cubic yards. Guernsey—not designed.

Length of canals: 90 miles with capacities greater than 800 second-feet; 8½ miles with capacities from 301 to 800 second-feet; 89 miles with capacities from 50 to 300 second-feet; 586 miles with capacities less than 50 second-feet.

Tunnels: Aggregate length, 985 feet.

Dikes: Aggregate length, 1,650 feet.

Water power: None developed.

Irrigable area (entire project): 129,270 acres (Nebraska 107,521 acres; Wyoming, 21,749 acres); North Platte Canal & Colonization Co., 17,874 acres; first lateral district, 36,760 acres; second lateral district, 34,100 acres; third lateral district, 38,000 acres; miscellaneous tracts, 2,536 acres.

Present status of irrigable land: 77,628 acres entered subject to the reclamation act; 5,009 acres open to entry, 721 acres withdrawn from entry; 11,048 acres of State lands; 34,864 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 90 miles with capacities more than 800 second-feet; 9 miles with capacities from 301 to 800 second-feet; 47 miles with capacities from 50 to 300 second-feet; 438 miles with capacities less than 50 second-feet.

Tunnels: Number, 3; total length, 985 feet.

Storage dams: Volume—Masonry, 60,210 cubic yards. (See also "Dikes.")

Diversion dams: Volume—Masonry, 4,966 cubic yards; earth, 75,775 cubic yards.

Dikes or levees for protection from overflow: Total length, 1,650 feet; volume, 136,162 cubic yards. (Including Pathfinder Dike.)

Canal structures: 27, costing more than $2,000 each; 97 costing from $500 to $2,000 each; 4,054 costing less than $500 each.

Bridges: Steel—11 with lengths of more than 50 feet; total length, 726 feet. Combination—11 with lengths of more than 50 feet; total length, 726 feet. Wood—2 with lengths of more than 50 feet, 78 with lengths less than 50 feet; total length, 1,816 feet.

Buildings: Offices, 2; residences, 4; barns and storehouses, 5.

Telephone lines: 1 mile built, 194 miles rented. Telephones in use, 33.

Material excavated: Class 1, earth, 8,641,294 cubic yards; class 2, indurated material, 536,396 cubic yards; class 3, rock, 199,120 cubic yards.

Riprap: 19,194 cubic yards.

Paving: 15,880 square yards.

Cement used: 111,822 barrels.

Concrete placed: 90,794 cubic yards.

AGRICULTURAL CONDITIONS

INTERSTATE CANAL

Area for which the service is prepared to supply water, season of 1911: 97,502 acres.

Area irrigated, season of 1911: 74,302 acres.

Length of irrigating season: From April 1 to September 30, 183 days.

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Character of soil of irrigable area: Sandy loam.
Principal products: Alfalfa, cereals, corn, sugar beets, potatoes.
Principal markets: Omaha, Nebr.; Kansas City and St. Joseph, Mo.; Denver, Colo.; central Wyoming.

LANDS OPENED FOR IRRIGATION

Dates of public notices and orders. July 29, 1907; May 29, 1908; June 16, 1908; November 12, 1908; March 3, 1909; March 27, 1909; June 2, 1909; March 12, 1910; April 4, 1910; June 6, 1910; July 2, 1910; September 10, 1910; March 7, 1911; March 24, 1911; and April 21, 1911.
Location of lands opened: Ts. 22 to 26 N., Rs. 53 to 60 W., sixth principal meridian.
Present status of irrigable lands opened: 53,205 acres entered subject to the reclamation act; 2,395 acres open to entry; 721 acres withdrawn from entry; 9,224 acres of State lands (including 2,179 acres of Carey Act lands); 31,994 acres in private ownership (including 12,326 acres of Carey Act lands).
Limit of area of farm units; Public, 80 acres; private, 160 acres.
Duty of water: 2½ acre-feet per acre per annum at the farm.
Charges per acre of irrigable land: Building $35; operation and maintenance $2 per annum; building $45, no charge for operation and maintenance for two years, $1.25 per annum thereafter.

CHRONOLOGICAL SUMMARY

Reconnaissance made and preliminary surveys begun in 1902.
Construction authorized by Secretary March 14, 1903.
Contract with the North Platte Canal & Colonization Co. for right of way for first part of Interstate Canal, December 22, 1904.
First irrigation by Reclamation Service, season of 1908.
Interstate Canal, first 95 miles completed May, 1908.
Whalen Diversion Dam completed February, 1909.
Pathfinder Dam completed June, 1909.
Pathfinder Dike completed May, 1911.
Interstate Canal, 114 miles completed June 30, 1911.
Entire project 78 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the North Platte project provides for the storage of flood waters of North Platte River in a reservoir controlled by the Pathfinder Dam, about 3 miles below the junction of the North Platte and Sweetwater Rivers and 50 miles southwest of Casper, Wyo., and in smaller reservoirs along the canal lines; the diversion of water from North Platte River by a dam near Whalen, Wyo., into the Interstate Canal, supplying water for lands on the north side of the river, and into the Fort Laramie Canal, watering lands on the south side of the river; and the diversion of water from North Platte River by a dam a short distance above Guernsey, Wyo., into a canal system supplying water for lands in Goshen Park, south of the river.

The features of the above irrigation plan which have been completed are: Pathfinder Dam and Dike; Whalen Diversion Dam; the first two divisions of the Interstate Canal; lateral systems of districts 1 and 2 of the Interstate Canal system.

Construction is in progress upon supplementary reservoirs; the third division of the Interstate Canal, and the third lateral district.

The features remaining for future construction are the Fort Laramie and Goshen Hole Canal systems.

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CONSTRUCTION DURING FISCAL YEAR

Pathfinder Reservoir.—The damage done to the gate chambers in the sluicing tunnel of the Pathfinder Dam by the force of the water which was discharged through it during the season of 1909 was repaired by the placing of cast-iron lining, during January, February, and March, 1911.

A low concrete spillway weir is being constructed in a curved form across the gap excavated in the granite rock forming the north abutment of the dam. The channel formed by this spillway discharges the flood water into the river about 600 feet below the dam. The excavation and concrete work were nearly completed in May, 1911, and the work is to be completed at the close of the present irrigation season.

The south side outlet tunnel, recommended by the board of engineers who visited the dam in December, 1909, is being constructed by force account. Prior to the irrigation season of 1910, the upper half of this tunnel, 7½ feet high by 14 feet in width, was excavated with the exception of a bulkhead of solid rock 21 feet thick. This bulkhead and the lower half of the tunnel were excavated during the winter of 1910–11, and the installation of the six circular cast-iron conduits which lead the water from the balanced valves into the tunnel was about half completed on March 15, 1911, at which time these conduits were bulkheaded in order to close the reservoir for storage. These conduits will be completed after the close of the present irrigation season, at which time the balanced valves and the grillage will also be installed.

The construction of the Pathfinder Dike, which is described in detail in the ninth annual report, was begun in February, 1910, and completed in May, 1911. The concrete core wall and earth work were completed in October, 1910, and the paving in May, 1911. This work was done by Government forces, as authorized by the Secretary of the Interior on December 22, 1909.

Interstate Canal.—Divisions 1 and 2 of the Interstate Canal, including the first 95 miles, were completed in May, 1908. Construction on the third division, known as the High Line, but in reality a continuation of the first two divisions, was started during the fall of 1910. This work is being done under small informal contracts and the structures are being built by Government forces. On June 30, 1911, 19 miles had been completed.

Distributing system.—The distributing system under the Interstate Canal consists of three districts. The lateral system of the first district was completed in the spring of 1908, and water was supplied to the farmers in this district during the same year. The second district was completed and water was furnished for irrigation in the spring of 1909. The excavation of the laterals in the third district, which embraces lands in the vicinity of and east of Winter Creek, was commenced in the winter of 1909–10, and is being continued by informal contracts. The structures are being built by force account. This third district includes 3½ miles of canal of 500 second-feet capacity, known as the Reservoir Supply Canal, 19 miles of canal of about 160 second-feet capacity, and 74 miles of canal of capacities of 50 second-feet and less and covers an irrigable area of about 38,000 acres, of which an area of 8,800 acres was opened for irriga-

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tion at the beginning of the season of 1911. The construction of the high line canal and the third lateral district, so far as completed on June 30, 1911, involved the excavation of about 806,000 cubic yards of material, and the construction of 9 large structures and 341 miscellaneous small structures.

Supplemental storage.—In the development of the third lateral district, it is necessary to provide supplemental storage reservoirs. There are three possible reservoir sites, known as Nos. 1, 2, and 3. The capacities of these reservoirs are 14,000, 27,000, and 67,000 acre-feet, respectively. No. 1 Reservoir will feed lateral systems embracing an irrigable area of about 18,000 acres, No. 2 will supply an irrigable area of 9,000 acres, and No. 3 will feed the reservoir canal extending from Reservoir No. 3 to Red Willow Creek and covering an irrigable area of about 19,000 acres. At present, the building of Nos. 1 and 3 only is contemplated, and plans for their construction have been prepared.

OPERATION AND MAINTENANCE

During the season of 1910 the Pathfinder Reservoir, diversion works, the first and second divisions of the Interstate Canal, and the first and second lateral districts, including 487 miles of canals, were operated and 688 farms, aggregating 42,362 acres of land, were irrigated. In addition, water was delivered under rental contracts to the laterals of the North Platte Canal & Colonization Co. for the irrigation of more than 7,000 acres of land. The maximum diversion at the Whalen Dam into the Interstate Canal was 1,300 second-feet, and the total diversion during the season was 317,000 acre-feet. In July a system of rotation in delivery of water was instituted, which has proved generally satisfactory. Considerable difficulty was encountered in maintaining the main canal near milepost 26 in the Rawhide Loop, due to the condition of the soil. This difficulty was remedied by excavating a trench 2 feet wide and 6 to 13 feet deep under 1,000 feet of canal bank, filling it with selected material puddled into place, and widening and protecting the canal bank with a heavy coat of gravel on the water side.

During the season of 1911 nearly 75,000 acres of land are being irrigated in the first, second, and third lateral districts. Water was diverted into the canals on March 28, and in June the main canal was carrying 1,300 second-feet of water. The system of rotation adopted the previous season is being continued, resulting in a more satisfactory irrigating head and greater economy in the use of water. On June 30, 1911, the Pathfinder Reservoir contained 390,000 acre-feet of water.

SETTLEMENT AND IRRIGATION

During the past season there has been little change on the North Platte project in the conditions of settlement. The population of the first, second, and third lateral districts is about 2,500. There has been little inquiry for irrigated or other lands, and the poor crop season of 1910 has doubtless accentuated this condition. During the year 1910, 81 farm units were filed upon. In 1910 the principal crops were alfalfa, wheat, oats, corn, and potatoes, but the yields were generally light, due to a variety of causes, including lack of rainfall, high winds, frosts, and lack of water at a critical period

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when repairs to the main canal were necessary. On dry lands there were practically no crops, while under some of the older ditches in the valley very good crops were produced.

For the season of 1911 good crops and high prices on all farm products are anticipated. The drought which prevailed during the early part of the season, together with the winds, did considerable damage to the small grains in the lighter and sandier soils, so that the yield of wheat, barley, rye, and oats will be medium. The condition of the crops which bring larger returns per acre, however, such as potatoes, beets, and corn, indicates a good yield. The farmers on the project have generally shown their good faith and optimism by the planting of about 11,500 acres in alfalfa the present season, and the conditions have so far been favorable to the young alfalfa. Generally speaking, the feeling of the settlers is one of optimism and faith in the future and the operation of the irrigation system seems to be giving satisfaction.

EXAMINATION OF WATER APPROPRIATIONS

Several applications have been made for the purchase of rights in the Pathfinder Reservoir for the benefit of lands under the old canals having rights to water during flood season, but running short in the months of August and September. Announcement has been made that a limited quantity of water can be temporarily delivered under rental contracts, but before permanent rights in the reservoir are sold it is desirable to ascertain as nearly as possible the various existing claims to waters of the North Platte River and to define these as accurately as possible, in order that they may be respected and the water to which they are entitled be definitely separated from the quantity available for storage. The State engineer of Nebraska was invited to join in an investigation to ascertain the extent to which prior appropriations had been actually applied to beneficial use and to obtain all data upon which a determination of existing water rights would be based. With this in view, on August 23, 1911, a contract was entered into between the United States and the Nebraska State Board of Irrigation, providing for cooperation in carrying out the provisions of the State law of 1911, requiring the board to examine into the condition of the various water appropriations within the State and into the condition of all ditches and canals constructed or partially constructed within the State, for the purpose of determining their several rights (sec. 6797, Cobbey's Annotated Statutes for 1911), such cooperation being limited to the North Platte River system.

The contract provides that the State shall furnish a qualified engineer for chief of party and two teamsters, and will pay all salaries and expenses of such men, and also furnish and pay for the feed, care, and upkeep of all horses, teams, and vehicles used by the parties engaged on the work. The United States agrees to furnish two qualified transit men, four rodmen or chainmen, and one hydrographer, together with a suitable number of horses, vehicles, instruments, and field supplies.

The State is to be the owner of and entitled to all notes and reports made by the said survey party, and the United States shall be enti-

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tled to duplicates of all maps and reports of transit notes by the transit men furnished by the United States, and also to a duplicate and the use of all such reports, maps, and data.

The contract provides that work under the agreement shall be begun immediately upon the execution of the contract and its approval by the Director of the Reclamation Service. This approval was given September 23, 1911.

PUBLIC NOTICE DATED JULY 2, 1910

In pursuance of the provisions of section 4 of the reclamation act approved June 17, 1902 (32 Stat., 388), notice is hereby given that water will be furnished from the North Platte project, Nebraska-Wyoming, for the irrigable lands shown on the revised plat of T. 23 N., R. 55 W., Nebraska, approved by the Secretary of the Interior May 7, 1910.

Applications for water rights, the charges, time, and manner of payments will be governed by the terms of the public notice of June 6, 1910, for the said project.

PUBLIC NOTICE DATED SEPTEMBER 10, 1910

In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), notice is hereby given for the North Platte project, Nebraska-Wyoming, as follows:

For all lands to which the rate of $45 per acre is applicable and for which charges for operation and maintenance shall become payable, the portion for operation and maintenance of the installments due December 1, 1910, and December 1 of each year thereafter until further notice shall be $1.25 per acre of irrigable land.

No water will be furnished in any year until the portions for operation and maintenance of all installments then due shall have been paid. Accordingly, no water will be furnished in the season of 1911 for any lands for which the portion of the installment for operation and maintenance becomes due December 1, 1910, and remains unpaid, and no water will be furnished in any subsequent season unless payment has been made of the portions of the installments for operation and maintenance then due and unpaid.

ORDER DATED MARCH 7, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section four of the reclamation act, and for other purposes," the following order is promulgated for the purpose of relieving the present situation on the North Platte project, pending the issue of public notice modifying or abrogating the notices heretofore issued.

2. (*a*) A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment will become effective as to all entries or water-right applications subject to public notices heretofore issued (except those prior to Mar. 3, 1909) for which a payment on account of the building charge has been heretofore made. (*b*) Such stay shall also apply to those for which no payment of the building charge has been made if, on or before March 31, 1911, payment is made of not less than $1 per acre on account of the building charge payable thereunder.

3. Such stay of proceedings shall remain in effect only until June 15, 1911, and water will be furnished to both classes described in paragraph 2 until said date without payment of the charge for operation and maintenance. If full payment of the charge for operation and maintenance be made on or before June 15, 1911, such stay of proceedings shall continue until further announcement by means of a permanent public notice or otherwise.

4. Upon failure to make payment on account of the building charge as herein required on or before March 31, 1911, the entry or water-right application, or both, as the case may be, which would otherwise be subject to cancellation, will be promptly canceled without further notice. In case of failure to pay the charge for operation and maintenance on or before June 15, 1911, no further water supply will be furnished.

5. This order shall not be construed to operate as a stay of proceedings in relation to entries or water-right applications which are subject to the building charge of $35 per acre.

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ORDER DATED MARCH 24, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section four of the reclamation act, and for other purposes," the following order is promulgated for the purpose of relieving the present situation on the North Platte project, pending the issue of public notice modifying or abrogating the notices heretofore issued, this being a revision of the order of March 7, 1911.

2. (*a*) A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment will become effective as to all entries or water-right applications subject to public notices heretofore issued (except public notices prior to Mar. 3, 1909) for which a payment on account of the building charge has been heretofore made. (*b*) Such stay shall also apply to those applications for which no payment on the building charge has been made if, on or before March 31, 1911, payment is made of not less than 50 cents per acre on account of the building charge payable thereunder.

3. Such stay of proceedings shall remain in effect only until June 15, 1911, and water will be furnished to both classes described in paragraph 2 until said date without payment of the charge for operation and maintenance. If part payment of the charge for operation and maintenance, to the amount of 25 cents per acre, be made on or before June 15, 1911, such stay of proceedings shall continue until further announcement by means of a permanent public notice or otherwise. The remainder of the charge for operation and maintenance for 1911, amounting to $1 per acre in addition to the 25 cents stated above, shall be paid on or before December 1, 1911.

4. Upon failure to make payment on account of the building charge as herein required on or before March 31, 1911, the entry or water-right application, or both, as the case may be, which would otherwise be subject to cancellation will be promptly canceled without further notice. In case of failure to pay the portion of the charge for operation and maintenance herein required on or before June 15, 1911, no further water supply will be furnished.

5. This order shall not be construed to operate as a stay of proceedings in relation to entries or water-right applications which are subject to the building charge of $35 per acre.

ORDER DATED APRIL 21, 1911

1. Pending the issue of the public notice under the terms of the reclamation act of June 17, 1902, announcing the limitations, charges, terms and conditions, under which water will be furnished to lands in the third lateral district, North Platte project, Nebraska-Wyoming, and as preliminary to the issue of such public notice, it is hereby ordered that water be furnished to lands in said district, as shown on plats approved March 10, 1911, for the irrigation seasons of 1911 and 1912, without charge for operation and maintenance, in pursuance of the plans heretofore adopted as the result of contract with the water users' association.

2. The public notice fixing the building charge and times of payment will be issued during the current year and the first installment of the charges will become due on December 1, 1911.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation during the fiscal year ending June 30, 1911:

Principal contracts, North Platte project

No.	Date	Contractor	Description	Estimated value	Estimated earnings, June 30, 1911	Completion due
334	Aug 6,1910	Pittsburgh Valve, Foundry & Construction Co.	Balanced valves...	$23,340	$23,065	Feb. 14,1911
338	Oct. 12,1910	Charles F. Elmes Engineering Works.	Discharge pipe....	6,500	.....	Dec. 9,1911

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, North Platte projec

ASSETS

Accounts receivable:			
Uncollected freight refunds		$1,491.71	
Uncollected miscellaneous rentals		59,721.45	
Uncollected miscellaneous		1,686.14	
Uncollected water-right building charges		411,313.77	
Uncollected water-right operation and maintenance charges		71,294.51	
			$545,507.58
Inventories:			
Mercantile store		1,523.64	
Government animals		23,774.00	
Equipment in use	$49,646.65		
Less depreciation	12,694.39		
		36,952.26	
Storehouse		22,714.40	
Cement		4,709.27	
Iron and steel		2,644.27	
Lumber		1,685.77	
Explosives		539.25	
Forage		4,005.20	
Fuel		943.24	
Cash in office safe		121.32	
Local products		1,728.04	
Freight and handling undistributed		1,460.12	
			102,800.78
Cost of work:			
Building cost	$4,780,349.19		
Plus adjustments	4,161.03		
		4,784,510.22	
Less adjustments	9,914.60		
Less accrued revenues	31,163.27		
		41,077.87	
			4,743,432.35
Operation and maintenance cost		479,152.88	
Less accrued revenues		83,774.05	
			396,378.83
Total assets			5,787,119.54

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$4,728,464.27		
Transfer vouchers received	592,193.00		
		$5,320,657.27	
Collection vouchers	173,997.44		
Transfer vouchers issued	15,694.08		
		189,691.52	
			5,130,965.75
Accounts payable:			
Unpaid labor		14,121.93	
Unpaid purchases		11,769.91	
Unpaid contract holdbacks		8,039.28	
Unpaid freight and express		13,310.18	
Unpaid passenger fares		131.08	
Unredeemed coupon books		23.00	
Unpaid miscellaneous		24.29	
			47,419.67
Repayments accrued:			
Building		510,073.10	
Operation and maintenance		98,661.02	
			608,734.12
Total liabilities			5,787,119.54

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Feature costs to June 30, 1911, North Platte project

Storage works:		
Real estate (submerged lands)	$205,957.56	
Pathfinder Dam	892,514.98	
Buildings: Gatekeeper's house, emergency gatehouse, and storehouse	19,303.69	
Pathfinder Dike	231,877.16	
Pathfinder Tunnel	157,344.91	
High-pressure gate	172,754.19	
Pile bridge	4,507.57	
Spillway dam	9,342.65	
		$1,693,602.71
Diversion works:		
Whalen Dam, contract	199,912.61	
Whalen Dam, force account	33,346.36	
Guernsey Dam	7,701.08	
Interstate Reservoir (supplemental storage)	19,973.35	
		260,933.40
Canal system:		
Earthwork	1,391,096.00	
Structures	577,396.75	
Surveys, third division main canal (high line)	14,290.10	
Surveys, Alcova-Casper Canal	1,222.09	
Surveys, Goshen Park	28,900.58	
Surveys, Fort Laramie Canal	8,206.01	
		2,021,111.53
Lateral system:		
Earthwork	372,581.73	
Structures	325,141.11	
Bridges	40,200.78	
Surveys, land lines	35,114.73	
		773,038.35
Real estate (rights and property):		
Lands purchased (not submerged)		31,663.20
Total building cost		4,780,349.19
Operation and maintenance:		
Pathfinder Dam—		
Distribution	1,413.86	
Protection	1,287.21	
Betterments	106.35	
Repairs	1,697.29	
		4,504.71
First division main canal—		
Distribution	32,747.90	
Protection	32,252.77	
Betterments	42,599.64	
Repairs	106,183.62	
		213,783.93
Rawhide first and second lateral districts—		
Distribution	100,995.22	
Protection	13,671.08	
Betterment	26,227.08	
Repairs	111,869.91	
		252,763.29
Demonstration farms—		
No. 1	1,469.96	
No. 2	3,602.38	
		5,072.34
Third lateral district—		
Distribution	1,898.00	
Protection	289.39	
Betterment	141.05	
Repairs	700.17	
		3,028.61
Total operation and maintenance cost		479,152.88
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		5,259,502.07

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NEVADA, TRUCKEE-CARSON PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Churchill, Storey, and Lyon.
Townships: 17 and 18 N., Rs. 17 to 30 E.; 19 N., Rs. 26 to 31 E.; 20 N., Rs. 22 to 31 E., Mount Diablo meridian.
Railroad: Southern Pacific.
Railroad stations: Fernley, Hazen, Fallon, and Lahontan, Nev.
Average elevation of irrigable area: 4,000 feet above sea level.
Average annual rainfall on irrigable area: 4 inches.
Range of temperature on irrigable area: 0° to 105°.

WATER SUPPLY

Source of water supply: Truckee and Carson Rivers.
Area of drainage basin: 3,450 square miles.
Annual run-off in acre-feet: Truckee River at Tahoe (519 square miles), 1901 to 1910—maximum, 703,000; minimum, 112,000; mean, 315,000. Truckee River near Vista (1,740 square miles), 1900 to 1910—maximum, 2,220,000; minimum, 394,000; mean, 892,000. Carson River at Empire (988 square miles), 1901 to 1910—maximum, 655,000; minimum, 178,000; mean, 392,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoirs: Lake Tahoe [1]—area, 125,000 acres; capacity, 750,000 acre-feet; length of spillway, 85 feet; elevation of spillway, 6 feet above stream bed. Alkali Flat—Area, 8,500 acres; capacity, 88,000 acre-feet. Lahontan—Area, 11,000 acres; capacity, 290,000 acre-feet; length of two spillways, 500 feet; elevation of spillways, 112 feet above stream bed.
Storage dams: Lake Tahoe—type, concrete sluiceway regulator; maximum height, 14 feet; length of crest, 109 feet; volume, 425 cubic yards. Lahontan—type, earth and gravel fill; maximum height, 124 feet; length of crest, 1,600 feet; volume, 770,000 cubic yards. Alkali Flat—not designed.
Diversion dams: Truckee River—type, concrete sluiceways; maximum height, 22 feet 4 inches; length of masonry, 171 feet; length of earth fill, 1,160 feet. Carson River—type, concrete sluiceways; maximum height, 20 feet 9 inches; length of masonry, 240 feet. Others not designed.
Length of canals in use (first unit): 42 miles with capacity greater than 800 second-feet; 62 miles with capacities from 301 to 800 second-feet; 80 miles with capacities from 50 to 300 second-feet; 503 miles with capacities less than 50 second-feet.
Tunnels: Number, 4; aggregate length, 2,840 feet.
Dikes: Aggregate length, 52,900 feet.
Water power: Estimated total, 8,000 horsepower.
Irrigable area: Entire project, 206,000 acres; first unit, 96,573 acres.
Present status of irrigable lands (entire project): 20,582 acres entered subject to the reclamation act; none open to entry; 119,869 acres withdrawn from entry; 102 acres of State lands; 65,447 acres in private ownership (including 10,031 acres of railroad lands).

RESULTS TO JUNE 30, 1911

Canals: 42 miles with capacities of more than 800 second-feet; 62 miles with capacities from 301 to 800 second-feet; 80 miles with capacities from 50 to 300 second-feet; 503 miles with capacities of less than 50 second-feet.
Tunnels: Number, 4; total length, 2,840 feet.
Diversion dams: Volume—masonry, 6,028 cubic yards; earth, 29,803 cubic yards.
Dikes or levees for protection from overflow: Total length, 52,900 feet; volume, 70,788 cubic yards.
Canal structures: 68 costing more than $2,000 each; 175 costing from $500 to $2,000 each; 1,339 costing less than $500 each.
Bridges: Combination—6 with lengths of 50 feet or more each; 8 with lengths of less than 50 feet each; total, 692 feet. Wood—7 with lengths of 50 feet or more each; 117 with lengths of less than 50 feet each; total, 3,543 feet.

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[1] Control of Lake Tahoe not fully acquired.

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Buildings: Offices, 4; residences, 14; barns and storehouses, 5.
Roads: 50 miles.
Telephone lines: 127 miles. Telephones in use, 40.
Material excavated: Class 1, earth, 9,028,268 cubic yards; class 2, indurated material, 84,511 cubic yards; class 3, 468,534 cubic yards.
Riprap: 16,555 cubic yards.
Paving: 39,665 square yards.
Cement used: 58,073 barrels.
Concrete placed: 41,886 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 50,000 acres.
Area irrigated, season of 1911: 34,000 acres.
Length of irrigation season: From April 1 to October 15—198 days.
Character of soil of irrigable area: Sand, sandy loam, adobe, and clay.
Principal products: Alfalfa, grain, potatoes, sugar beets, and onions.
Principal markets: Nevada mining camps, California cities.

LANDS OPENED FOR IRRIGATION

Dates of public notices and orders relating thereto: May 6, 1907; November 1, 1907; January 30, 1908; April 4, 1908; June 5, 1908; December 26, 1908; March 1, 1909; September 28, 1909; April 26, 1910; September 16, 1910; April 22, 1911.
Location of lands opened: Ts. 17 to 20 N., Rs. 24 to 31 E., Mount Diablo meridian.
Present status of irrigable lands: 20,582 acres entered subject to the reclamation act; none open to entry; 29,772 acres withdrawn from entry; 102 acres of State lands; 46,117 acres in private ownership (including 10,031 acres of railroad lands).
Limit of area of farm units: Public, 80 acres; private, 160 acres.
Duty of water: 3 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $22 and $30.
Annual operation and maintenance charge: $0.60 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnaissance made and preliminary surveys begun in 1902.
Construction authorized by Secretary March 14, 1903.
Truckee Canal completed June, 1905.
Carson River headworks and main distributing canals completed September, 1905.
First irrigation by Reclamation Service, season of 1906.
Truckee Canal chute completed November, 1910.
Construction of Lahontan Dam begun January, 1911.
First unit 90 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Truckee-Carson project provides for the storage of water in a number of small reservoirs on the headwaters of Truckee River, in Lake Tahoe, in the Alkali Flat Reservoir, near Churchill, Nev., and in Lahontan Reservoir, on Carson River, near Hazen, Nev.; the diversion of water from Truckee River by a dam about 20 miles below Reno, Nev., into the Truckee Canal, supplying water to lands in the Truckee and Carson River Valleys and to the Lahontan Reservoir; the diversion of water from Carson River by a dam near Dayton, Nev., into two canals, one watering lands south of the river and the other watering lands north of the river and supplying Alkali Flat Reservoir; the return to Carson River through an outlet tunnel and canal of water from Alkali Flat Reservoir; the diversion of water from Carson River by a dam about 3 miles below the outlet of Alkali Flat Reservoir into two canal systems watering lands in Churchill Valley on both sides of the river; and the diversion of water from Carson River by a dam about 5 miles below the Lahontan storage dam into two canal systems, one on

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either side of the river, watering lands in the lower Carson River Valley.

The features of the above irrigation plan which have been completed are: The diversion dam in the Truckee River; the Truckee Canal, carrying water from this diversion and discharging into the Carson River above the site of Lahontan Dam; the Truckee Canal concrete chute; the diversion dam in Carson River, situated about 5 miles below Lahontan Dam; that portion of the complete distribution system which includes laterals taking out of Truckee Canal in the vicinity of Fernley and Hazen, and two main canal systems heading at Carson diversion dam and extending over the main portions of the project in Carson Sink, with Fallon as a center.

Construction is in progress on the Lahontan Dam for the storage of flood waters in the Carson River.

The features remaining for future construction are: The completion of the dam controlling the outflow from Lake Tahoe and the construction of distributing systems for the several extensions to the project which lie adjacent to and on all sides of the project as already constructed, and such extensions of the drainage system as are found necessary.

CONSTRUCTION DURING FISCAL YEAR

Truckee Canal Chute.—The Truckee Canal terminates at the site of Lahontan Reservoir, with a water surface elevation about 130 feet above the bed of Carson River and about 14 feet above the highest water level proposed for the reservoir surface. At this point the water has been discharged into Carson River since 1905 through a temporary wooden flume or chute built on a steep side hill. In 1910 this temporary flume was replaced by a concrete chute, or lined channel, with a long weir crest at the head to regulate within safe limits the water level in the canal above. The complete structure includes an approach section 300 feet long of open-lined canal leading into a long rectangular forebay with a weir crest along either side and a set of flashboard gates across the end of the forebay. The discharge over each weir crest falls into a tailrace channel paralleling the crest, the two coming together in a funnel-shaped channel below the flashboard gates which connects smoothly into the regular channel of the chute proper. The weir and gate section has a total length of 141 feet. The chute proper begins at this point with a channel of ordinary canal section with flat bottom and 1 to 1 side slopes, but modified by having the angle between the side and bottom smoothed out by a curve and the upper part of the slope curved up to a vertical face. This section continues for 210 feet, then in the next 74 feet it changes by warping into a rectangular cross section 10 feet wide which runs for 357 feet, and then changes to 9 feet in width in the final 40 feet. The end is built as a cantilever, overhanging 18 feet and strongly anchored to a heavy anchor block under the adjoining upstream portion. The total length of the structure is 1,122 feet, and of the chute proper, 681 feet. The drop from maximum water level in canal to end of chute is 52 feet. At the end of the chute the water drops on a rocky slope and finds its way down this slope to the river. The chute was constructed entirely by Government forces. Work was begun in June, 1910, and completed in the following November.

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Lahontan Dam.—The Lahontan Dam is located at a point where Truckee Canal discharges into Carson River, about 7 miles south and west of Hazen and at the new railroad station of Lahontan, Nev. The dam is of the earth and gravel fill type, has a maximum height of 124 feet, a crest length of 1,600 feet, and a volume of 770,000 cubic yards. It will form a storage reservoir having an area of 11,000 acres and a capacity of 290,000 acre-feet. The embankment is to be 20 feet wide on top, with an upstream slope of 3 to 1, protected by 2 feet of riprap, and a downstream slope of 2 to 1, protected by 12 inches of riprap. Near the upstream toe of the dam there is a cut-off trench 15 feet in depth, having a concrete wall 2 to 4 feet in thickness extending to an additional depth of 30 feet. Two concrete spillways are to be constructed in the embankment near the ends, one on each side of the river, having the crest 12 feet below the top of the dam. The length of each spillway is 250 feet and the water flows down over concrete steps, winding through about 90° to the opposite sides of a central circular pool in the river bed near the toe of the dam. This pool will have a diameter of 220 feet and a depth of 30 feet, and will serve to retard the velocity of the water sufficiently to allow its discharge into the old river bed without danger of eroding the soil. The outlet works consist of twin concrete conduits of horseshoe shape, approximately 9 feet in diameter. The gates are to be operated from a gate tower at the upper end of the conduit.

The construction of Lahontan Dam by Government forces was approved by the Secretary of the Interior on December 31, 1910, upon the report and recommendation of a board of consulting engineers. The selection and purchase of construction equipment was commenced immediately thereafter, and the building of the construction camp was begun in February, 1911.

At the close of the fiscal year the camp was completed and fully equipped for taking care of from 200 to 300 men, a large amount of equipment was received and installed, and a beginning was made in actual construction work on the dam. The principal feature of the installation work has been in the construction of a hydroelectric plant of 1,000-kilowatt capacity, which has been designed to furnish ample power for operating the construction plant. When the dam is completed it is expected that use will be found on the project for the entire 1,000-kilowatt capacity of the power plant. The excavation for the outlet conduit has been practically completed and work is in progress upon the cut-off channel and the left spillway. Two steam shovels are in operation.

OPERATION AND MAINTENANCE

During the season of 1910 the entire system completed to date, including 280 miles of canals and laterals, was operated from April 1 to October 15, and 415 farm units, aggregating nearly 28,000 acres of land, were irrigated. During the spring when water was abundant delivery to users was made upon request without endeavoring to limit the use to the prescribed duty, but as soon as the supply became limited users were required to take their water in rotation and in prorate amounts. Approximately 178,000 acre-feet of water was diverted from the rivers, of which 53 per cent was distributed to the

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farm turnouts, 7 per cent was wasted through spillways, and 19 per cent was returned to the channels for use of vested right owners, and 21 per cent was lost by seepage and evaporation. The average duty of water, based on delivery at the farm, was 4.65 acre-feet per acre. There were 28,000 acres of land under irrigation during the season. During the season of 1911, 34,000 acres are being irrigated. No serious obstacles to the operation of the canals were encountered. The principal features of maintenance work were the cleaning of smaller laterals and drains during the winter season and repairing breaks and clearing channels of vegetation in the summer. The placing of all gates under lock has required considerable additional work upon farm turnouts and other structures.

SETTLEMENT AND IRRIGATION

As the area now settled will require all of the available flow of the Truckee and Carson Rivers until storage is provided, all lands were withdrawn from entry and from water-right applications on September 16, 1910. There has therefore been no settlement upon new lands since that date, though the subdivision of private holdings and the renting of small acreages to potato and beet growers have contributed to increase the population on the farms, which was about 1,400 on January 1.

The irrigation season of 1910 was generally successful. The yield of alfalfa, the staple crop, was 50 per cent greater than for any preceding season, though the grain yield fell somewhat below the average. The estimated value of the total crop of 1910 was $310,000, being an average value of $17.50 per acre gross return. Due to a late spring the hay crop for 1911 will probably be smaller than that of last season. Grain gives promise of very good returns. Sugar beets are being raised this season on a limited acreage for the factory now under construction at Fallon.

ORDER DATED SEPTEMBER 16, 1910

It having been found impracticable to furnish water for additional lands under the Truckee-Carson project, Nevada, pending the acquirement of adequate storage facilities, the public notices heretofore issued and the farm unit plats heretofore filed in connection with the project, under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), are hereby suspended as to all farm units shown on such plats for which entry has not been made or for which application for entry has not been heretofore filed; and it is hereby ordered that no applications for entry be accepted for such farm units until further notice.

It is further ordered that from and after fifteen days from the date of first publication hereof, such public notices and plats shall be suspended as to lands in private ownership designated on such plats for which water-right application has not theretofore been filed, and thereafter no water-right application shall be received for such lands until further notice.

ORDER DATED APRIL 22, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public No. 355), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section 4 of the reclamation act, and for other purposes," the terms and conditions of the public notice issued May 6, 1907, for lands irrigable under the Truckee-Carson project, Nevada, constructed in pursuance of the reclamation act of June 17, 1902 (32 Stat., 388), and of all orders and notices amendatory thereof or supplementary thereto, in so far as the same relate to the time when installments shall be due and payable for lands hereinafter designated, are hereby modified as follows:

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2. For all water-right applications, whether for public or private lands, filed on and after June 15, 1907, and prior to January 1, 1908, the date when the first installment of the charges for building, operation, and maintenance became due is hereby advanced to December 1, 1908; the second and third installments of such charges are hereby advanced to December 1, 1909, and December 1, 1910, respectively. The installments of said charges for subsequent years shall be due on December 1 of each subsequent year.

3. The terms and conditions of public notice issued May 6, 1907, and of all orders and notices amendatory thereof or supplementary thereto shall remain in full force and effect except as modified herein.

4. The payments heretofore made on account of operation and maintenance charges for the lands affected shall be adjusted in accordance with the provisions of this order.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation during the fiscal year ending June 30, 1911:

Principal contracts, Truckee-Carson project

No.	Date	Contractor	Description	Estimated value	Estimated earnings, June 30, 1911	Completion due
369	May 1, 1911	General Electric Co...	Electrical apparatus.	$8,213.00	.....	Aug. 24, 1911
373	May 4, 1911	Pelton Water Wheel Co.	Hydraulic turbines..	9,740.00	.....	Jan. 24, 1912
374	May 19, 1911	Wm. B. Pollock Co....	72-inch penstock....	4,086.36	.....	July 20, 1911

FINANCIAL STATUS

Assets and liabilites on June 30, 1911, Truckee-Carson project

ASSETS

Accounts receivable:			
Uncollected miscellaneous		$341.87	
Uncollected water-right building charges		61,519.96	
Uncollected water-right operation and maintenance charges		4,086.40	
			$65,948.23
Inventories:			
Mercantile store		3,806.94	
Government animals		9,317.34	
Equipment in use	$72,679.33		
Less depreciation	5,125.75		
		67,553.58	
Storehouse		33,324.02	
Cement		686.44	
Iron and steel		4,885.05	
Lumber		6,379.33	
Explosives		1,243.83	
Fuel		2,162.31	
Cash in office safe		293.40	
Freight and handling undistributed		5,934.25	
			135,586.49
Cost of work:			
Building cost		3,917,698.48	
Less adjustments	6,514.42		
Less accured revenues	7,605.21		
		14,119.63	
			3,903,578.85
Operation and maintenance cost		330,871.20	
Less accrued revenues		3,151.81	
			327,719.39
Total assets			4,432,832.96

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LIABILITIES

Investment of the United States:			
Disbursement vouchers	$4,183,746.26		
Transfer vouchers received	177,382.80		
		$4,361,129.06	
Collection vouchers	229,750.10		
Transfer vouchers issued	28,032.25		
		257,782.35	
			$4,103,346.71
Accounts payable:			
Unpaid labor		7,813.94	
Unpaid purchases		22,189.34	
Unpaid contract estimates		6,680.85	
Unpaid freight and express		19,264.45	
Unpaid passenger fares		249.90	
Unredeemed coupon books		84.10	
Unredeemed meal tickets		32.00	
Unpaid miscellaneous		37.40	
			56,351.96
Repayments accrued:			
Building		206,196.13	
Operation and maintenance		66,938.14	
			273,134.27
Total liabilities			4,432,832.96

Feature costs to June 30, 1911, Truckee-Carson project

Buildings:		
Headquarters and permanent building	$43,198.38	
Ditch tenders' houses	6,346.03	
		$49,544.41
Distributing system:		
Main canals	407,414.12	
Lateral and drainage system	245,245.01	
Carson River channel	125,051.84	
Lower Carson diversion dam	82,222.92	
Power-house drop, V line	61,843.29	
		1,921,777.18
Examination of project as a whole:		
Examination, general	39,308.81	
Examination reservoir sites and storage	60,310.65	
Hydrography	9,566.18	
Topographic survey	55,002.36	
		164,188.00
Headquarters grounds:		
Cultivation and maintenance		6,299.43
Storage system:		
Lake Tahoe reservoir and regulating works	4,323.97	
Lahontan reservoir	77,557.98	
		81,881.95
Main Truckee Canal:		
Earthwork and structures, including Derby Bridge	1,535,262.74	
Improvement	4,754.75	
Truckee concrete chute	28,248.54	
		1,568,266.03
Pyramid Lake Canal:		
Preliminary location	2,258.86	
Examination	597.39	
		2,856.25
Real estate:		
Rights of way and land purchased	54,763.37	
Rights of way donations	797.74	
		55,561.11

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Irrigable lands:		
Farm unit subdivision	$2,294.48	
Location, survey, miscellaneous	1,441.98	
Section lines, Carson Sink Valley	10,342.51	
Water right examination	3,535.37	
		$17,614.34
Telephone system:		
Construction		41,945.82
Carson Lake drain:		
Preliminary expense		3,690.82
Inventory of cost ledger supplies:		
Headquarters shop	231.88	
Automobile	106.84	
Corrals	2,808.56	
Messes	925.86	
		4,073.14
Total building cost		3,917,698.48
Operation and maintenance:		
Operation	103,673.71	
Flood expense (extraordinary)	73,610.83	
Maintenance	153,586.66	
		330,871.20
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		4,248,569.68

NEW MEXICO, CARLSBAD PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Eddy.
Townships: 18 to 24 S., Rs. 25 to 29 E., New Mexico meridian.
Railroad: Eastern Railway of New Mexico (Santa Fe System).
Railroad stations: Carlsbad, Otis, Loving, and Malaga, N. Mex.
Average elevation of irrigable area: 3,100 feet above sea level.
Average annual rainfall on irrigable area: 15 inches.
Range of temperature on irrigable area: 0° to 110°.

WATER SUPPLY

Source of water supply: Pecos River.
Area of drainage basin: 22,000 square miles.
Annual run-off in acre-feet of Pecos River at Carlsbad (22,000 square miles), 1899 to 1910—maximum, 912,000; minimum, 148,000; mean, 310,000.

DATA FOR COMPLETE PROJECT

Reservoirs: Avalon—area, 970 acres; capacity, 7,000 acre-feet; length of three spillways 1,000 feet; elevation of spillways, 21 feet above stream bed. McMillan—area, 6,100 acres; capacity, 40,000 acre-feet; No. 1 spillway, 250 feet in length and 23.3 feet above stream bed; No. 2 spillway, 600 feet in length and 25 feet above stream bed.
Storage dams: Avalon—type, earth and rock fill with concrete core wall; maximum height, 50 feet; length of crest, 1,380 feet; volume, 168,300 cubic yards. McMillan—type, earth and rock fill; maximum height, 52 feet; length of crest, 1,686 feet; volume, 140,700 cubic yards.
Length of canals: 13 miles with capacities greater than 300 second-feet; 12 miles with capacities from 300 to 50 second-feet; 120 miles with capacities less than 50 second-feet.
Dikes: Aggregate length, 4,350 feet at Lake McMillan.
Irrigable area: 20,267 acres.
Present status of irrigable land: All in private ownership.

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RESULTS TO JUNE 30, 1911.

Canals: 13 miles with capacities from 301 to 800 second-feet; 12 miles with capacities from 50 to 300 second-feet; 120 miles with capacities less than 50 second-feet.
Storage dams: McMillan—volume, earth, 92,500 cubic yards; rock fill, 48,200 cubic yards. Avalon—volume, masonry, 5,941 cubic yards; earth, 103,207 cubic yards; rock fill, 59,152 cubic yards.
Dikes or levees for protection from overflow: Total length, 4,350 feet; volume, 53,565 cubic yards.
Canal structures: 3 costing more than $2,000 each; 6 costing from $500 to $2,000 each; 34 costing less than $500 each.
Bridge: Wood, 1; length, 225 feet.
Buildings: Office, 1; residences, 5; barns and storehouses, 8.
Material excavated: Class 1, earth, 433,450 cubic yards; class 2, indurated material, 18,380 cubic yards; class 3, rock, 55,400 cubic yards.
Riprap: 39,700 cubic yards.
Cement used: 10,365 barrels.
Concrete placed: 10,480 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 20,267 acres.
Area irrigated, season of 1911: 13,673 acres.
Length of irrigating season: From March to November and two weeks in winter, 260 days.
Character of soil of irrigable area: Fertile alluvium.
Principal products: Alfalfa, cotton, grain crops, grapes, melons, peaches, pears, and miscellaneous fruits.
Principal markets: Carlsbad, N. Mex.; Denver, Colo.; Chicago, Ill.; Kansas City, Mo.; Texas cities.

LANDS OPENED FOR IRRIGATION

Dates of public notices: December 17, 1907; November 30, 1908; June 2, 1909; November 17, 1909; October 7, 1910; March 13, 1911.
Location of lands opened: Tps. 21, 22, 23, 24 S., Rs. 26, 27, 28, 29 E., New Mexico meridian.
Irrigable lands opened: 20,267 acres; all in private ownership.
Limit of area of farm units: 160 acres.
Duty of water: 3 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $31.
Annual operation and maintenance charge: $1.35 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance made and preliminary surveys begun in 1904.
Canal system of Pecos Irrigation Co. purchased December 18, 1905.
Construction authorized by Secretary Februray 24, 1906.
First irrigation by Reclamation Service, season of 1906.
Black River Canal: Reconstruction completed May, 1906.
Avalon Dam: Reconstruction completed November, 1907.
McMillan Reservoir: Reconstructed 1907–1909.
Main canals and distribution system rebuilt 1906 to 1909.
Project completed July, 1909.

IRRIGATION PLAN

The irrigation plan of the Carlsbad project provides for the storage of water in Lake McMillan, on Pecos River, near Lakewood, N. Mex., and in a storage and distributing reservoir on the same river near Carlsbad, N. Mex., controlled by Avalon Dam; and the diversion of water from Avalon Reservoir into a canal system, watering lands on both sides of Pecos River in the vicinity of Carlsbad.

The construction of the project was completed in 1909, and the principal features are: The Avalon and McMillan earth and rock-fill dams; the former having a concrete core wall; a concrete flume

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or aqueduct spanning the Pecos River, with 4 arches of 100 feet each; a reenforced concrete siphon 6 feet in diameter and 400 feet long, under Dark Canyon; about 50 miles of canals and laterals (exclusive of sublaterals and ditches); a concrete head-gate structure at each of the dams; and a concrete spillway at Avalon Dam equipped with wooden emergency gates reenforced with iron. All check-gate, spillway, and head-gate structures on the canals and all turnouts on the laterals are of concrete construction.

CONSTRUCTION DURING FISCAL YEAR

The only construction work during the year was that of building small concrete lateral turnouts and weirs.

OPERATION AND MAINTENANCE

During the season of 1910 the entire system, including 45 miles of canals, was operated and 307 farms, aggregating 13,105 acres, were irrigated. Approximately 93,000 acre-feet of water were diverted to the main canal at the Avalon Dam and 40,000 acre-feet were used on the farms. At the close of the season 18,000 acre-feet of water remained in storage. At the end of the irrigation season the main canal bottom was found to be very rough, caused by deposits of silt and sand. This condition is attributable to the dense growth of moss in the summer season, which causes uneven velocities, which in turn cause serious erosion and deposits of the eroded material. A portion of the main canal about 2,600 feet long was treated with crude petroleum as an experiment to determine its effect on the growth of moss and to lessen seepage. Up to this time the moss has made practically no growth since the application of the oil, although in untreated portions of the canal the moss has been as troublesome as usual.

During the season of 1911, 13,823 acres are being irrigated. At the beginning of the irrigation season on March 15 there were 36,000 acre-feet of water in storage and the supply has continued ample.

SETTLEMENT AND IRRIGATION

Settlement on the project during the season has been slow. Recently a Mennonite colony has bought about 1,200 acres of land and several families have moved to the project. On January 1 there were 800 people living on the farms. The total value of crops for the season of 1910 was $220,160, or an average of about $17 per acre. Alfalfa and cotton were the principal crops and results on good farms were very satisfactory. Of the total acreage in crop for the season of 1911 there are 7,114 acres in alfalfa and 4,100 acres in cotton. The sorghum and corn crops make up the remainder, except about 600 acres in fruit trees. Good crop conditions exist. The peach crop this season is large and shipments of fruit were being made during the latter part of June at the rate of one and one-half carloads per day.

PUBLIC NOTICE DATED OCTOBER 7, 1910

1. In pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), notice is hereby given as follows, with regard to lands under the Carlsbad project, New Mexico:

2. Acceptable water-right applications must be filed on or before December 31, 1910, for all private lands under the said project for which water-right applications

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have not been heretofore filed, with payment of all installments of charges for building, operation and maintenance, beginning with the installment due December 1, 1908, in accordance with the public notices and orders heretofore issued for the said project, the total payment at the time of filing being of such amount that not more than one installment then due shall remain unpaid.

3. All lands for which water-right applications shall not be filed in accordance with this notice shall forthwith be eliminated from the irrigable area of the project, and no water shall thereafter at any time be furnished to such lands, but other lands of equal area shall be admitted to irrigation in lieu thereof.

4. Appropriate plats showing the new lands thus admitted to the irrigable area will be filed in the local land office at as early a date as practicable after December 31, 1910.

PUBLIC NOTICE DATED MARCH 13, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section 4 of the reclamation act and for other purposes," the following order is promulgated for the purpose of relieving the present situation of the lands under the Carlsbad project pending the issuance of public notice modifying or abrogating the notices heretofore issued:

2. A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment of the building charge will become effective as to all entries and water-right applications subject to the public notices and orders heretofore issued upon the payment on or before March 31, 1911, of the charges for operation and maintenance for the year 1910, provided all prior charges for operation and maintenance are paid, and subject also to compliance with the conditions of a public notice to be hereafter issued, which will provide for an increased building charge, which shall be determined after further investigation. Such stay of proceedings shall remain in effect until further announcement by means of a public notice or otherwise.

3. Upon failure to make payment as herein required on or before March 31, 1911, the entry or water-right application, or both, as the case may be, which would otherwise be subject to cancellation, will be promptly canceled without further notice.

4. All applications for water rights filed under the provisions of notices heretofore issued and for which the payment necessary to avoid cancellation shall have been made on or before March 31, 1911, shall be continued in effect under such prior notices.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Carlsbad project

ASSETS

Accounts receivable:			
Uncollected water rentals		$180.75	
Uncollected water-right building charges		105,821.60	
Uncollected water-right operation and maintenance charges		20.30	
			$106,022.65
Inventories:			
Government animals		635.00	
Equipment in use		5,341.70	
Storehouse		838.42	
Cement		55.69	
Lumber		731.62	
Forage		406.46	
			8,008.89
Cost of work:			
Building cost		605,687.19	
Less adjustments	$458.10		
Less accrued revenues	9,669.89		
		10,127.99	
			595,559.20
Operation and maintenance cost		125,955.99	
Less accrued revenues		4,548.69	
			121,407.30
Total assets			830,998.04

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LIABILITIES

Investment of the United States:			
Disbursement vouchers	$731,317.84		
Transfer vouchers received	17,434.30		
		$748,752.14	
Collection vouchers	166,720.65		
Transfer vouchers issued	10,850.12		
		177,570.77	
			$571,181.37
Accounts payable:			
Unpaid labor		1,260.22	
Unpaid purchases		219.77	
Unpaid freight and express		1,242.18	
Unpaid passenger fares		14.30	
			2,736.47
Repayments accrued:			
Building		187,376.40	
Operation and maintenance		69,703.80	
			257,080.20
Total liabilities			830,998.04

Feature costs to June 30, 1911, Carlsbad project

Storage works:		
Avalon storage and diversion dam	$215,972.88	
McMillan storage dam	4,751.58	
		$220,724.46
Canal distribution system:		
Main, East Side, and Black River Canals	179,241.30	
Lateral system	11,996.00	
		191,237.30
Real estate:		
Lands and rights of way		151,904.96
Preliminary examination:		
Engineering	16,162.86	
Examination	8,887.99	
Surveys	9,445.79	
Drillings	3,801.76	
Designs	1,202.33	
Hydrography	1,928.27	
Classification and subdivision	391.47	
		41,820.47
Total building cost		605,687.19
Operation and maintenance:		
Operation as a whole	35,740.16	
Maintenance of Avalon Dam	3,304.54	
Maintenance of McMillan Reservoir	30,830.22	
Maintenance of canal system	14,836.14	
Maintenance of laterals and ditches	31,653.35	
Maintenance of evaporation stations	737.98	
Maintenance of buildings	2,862.72	
Maintenance of Black River cut-off	3,465.67	
Experimental farm	1,870.81	
New spillgates	654.40	
		125,955.99
Total building and operation and maintenance cost as per debit in cost of work in statement of assets and liabilities		731,643.18

NEW MEXICO, HONDO PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Chaves.
Townships: 11 and 12 S., Rs. 22, 23, and 24 E., New Mexico meridian.
Railroad: Eastern Railway of New Mexico (Santa Fe system).
Railroad station: Roswell, N. Mex.
Average elevation of irrigable area: 3,750 feet above sea level.
Average annual rainfall on irrigable area: 16 inches.
Range of temperature on irrigable area: 0° to 100°.

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WATER SUPPLY

Source of water supply: Hondo River.
Area of drainage basin: 1,037 square miles.
Annual run-off in acre-feet of Hondo River at the diversion dam (1,037 square miles), 1903 to 1907: Maximum, 90,500; minimum, 10,100; mean, 46,300.

DATA FOR COMPLETE PROJECT

Reservoir: Hondo—Area, 1,910 acres; capacity, 40,000 acre-feet.
Storage dams: 6 earth embankments; maximum height, 25 feet; aggregate length, 16,200 feet; volume, 421,350 cubic yards.
Diversion dam: Type, earth fill; maximum height, 20 feet; length, 100 feet; volume 3,700 cubic yards.
Length of canals: 3 miles with capacities greater than 300 second-feet; 2 miles with capacities from 300 to 50 second-feet; more than 40 miles with capacities less than 50 second-feet.
Irrigable area: 10,000 acres.
Present status of irrigable land: 240 acres entered subject to the reclamation act; 9,760 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 3 miles with capacities from 301 to 800 second-feet; 2 miles with capacities from 50 to 300 second-feet; 7½ miles with capacities less than 50 second-feet.
Storage dams: Volume 421,350 cubic yards (earth fill).
Diversion dams: Volume, rock fill, 3,700 cubic yards.
Canal structures: 10 costing from $500 to $2,000 each; 77 costing less than $500 each.
Bridges: Wood, 11 ; total length, 130 feet.
Buildings: Residences, 1.
Telephone lines: 14 miles; telephones in use, 5.
Material excavated: Class 1, earth, 772,990 cubic yards; class 2, indurated material, 3,000 cubic yards; class 3, rock, 35,590 cubic yards.
Riprap: 86,355 cubic yards.
Cement used: 2,782 barrels.
Concrete placed: 3,718 cubic yards.

AGRICULTURAL CONDITIONS

Area irrigated, season of 1911: 1,000 acres.
Length of irrigating season: From March to November—245 days.
Character of soil of irrigable area: Rich alluvium.
Principal products: Alfalfa and fruits.
Principal markets: Roswell, N. Mex.; Kansas City, Mo.; Chicago, Ill.; and Texas cities.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. One thousand acres are being irrigated under rental contracts.)

CHRONOLOGICAL SUMMARY

Reconnaissance and preliminary surveys begun in 1903.
Construction authorized by Secretary September 6, 1904.
Hondo Reservoir site purchased December 3, 1904.
Hondo Reservoir and Inlet Canal completed August, 1906.
Distributing canals completed April, 1907.
Project completed May, 1907.

IRRIGATION PLAN

The irrigation plan of the Hondo project provides for the diversion of water from the Hondo River about 12 miles southwest of Roswell, N. Mex., through a short inlet canal, into a natural storage reservoir, the capacity of which is increased by embankments; the return of stored water to the river, and the diversion of water from the river

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by three dams, 2, 4, and 6 miles, respectively, below the reservoir, into canal systems watering lands in the vicinity of Roswell, N. Mex.

All features of this project are completed and no construction work was in progress during the fiscal year.

OPERATION AND MAINTENANCE

Since the completion of the project in 1907, there has been little flood water available for storage, due to the continuance of drouth conditions, and inasmuch as the normal flow of the stream above the project lands is fully appropriated the supply of water to settlers on the project has been very limited. Because of these conditions the lands on the project have not been formally opened for irrigation, and the operation and maintenance work has so far been confined to the distribution under rental contracts of the small supply of water that has been available and the making of minor repairs and betterments to the canals and structures.

During the season of 1910 the irrigation system was operated when water was available and 20 farm units, aggregating 1,300 acres of land, were supplied with water. During August a little water was available for storage. During the other months of the year it was diverted directly to the lands.

During the season of 1911 about 1,000 acres of land were irrigated up to June 30, and in May 1,200 acre-feet of water was stored in the reservoir.

SETTLEMENT AND IRRIGATION

The lands under irrigation are planted to alfalfa and orchards, but on account of the insufficient supply of water the crop returns in 1910 were limited. Crop conditions in 1911 have improved somewhat and fair yields of hay have been obtained. The continued shortage of water has, however, injured the orchards.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Hondo project

ASSETS

Accounts receivable: Uncollected water rentals			$528.00
Inventories: Government animals			210.00
Cost of work:			
Building cost	$352,788.30		
Less accrued revenues	4,022.23		
			348,766.07
Total assets			349,504.07

LIABILITIES

Investment of the United States:			
Disbursements vouchers	$367,430.49		
Transfer vouchers received	11,312.18		
		378,742.67	
Collection vouchers	28,782.69		
Transfer vouchers issued	747.78		
		29,530.47	
			349,212.20

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Accounts payable:		
Unpaid labor	$182.52	
Unpaid purchases	73.62	
Unpaid freight and express	19.08	
Unpaid passenger fares	16.65	
		$291.87
Total liabilities		349,504.07
Feature costs to June 30, 1911, Hondo project:		
Storage works:		
Reservoir and embankment	$96,246.60	
Outlet canal, excavation and embankment	57,772.59	
Protection embankment and outlet canal	825.48	
		$154,844.67
Diversion system:		
Inlet canal, laterals, headworks, and earthwork	97,341.72	
Diversion dam, rock excavation	35,536.31	
		132,878.03
Real estate (rights and property), lands purchased		21,599.46
Irrigable lands, farm-unit subdivision		19,837.41
Buildings:		
Construction	1,738.99	
Maintenance	424.37	
		2,163.36
Telephone line:		
Construction	4,170.42	
Maintenance	67.71	
		4,238.13
Total building cost		335,561.06
Operation and maintenance (during construction):		
Operation as a whole	13,854.22	
Maintenance, inlet canal	164.34	
Maintenance, outlet canal	19.01	
Maintenance, reservoir	698.85	
Maintenance, distributing system	2,490.82	
		17,227.24
Total building cost as per debit in cost of work in statement of assets and liabilities		352,788.30

NEW MEXICO-TEXAS, RIO GRANDE PROJECT[1]

LOCATION AND CLIMATIC CONDITIONS

Counties: Sierra, Socorro, Dona Ana, N. Mex.; El Paso, Tex.
Townships: 8 to 29 S., Rs. 3 E. to 5 W., New Mexico meridian.
Railroads: Atchison, Topeka & Santa Fe; El Paso & Southwestern; Southern Pacific; Texas & Pacific.
Railroad stations: Engle, Rincon, Las Cruces, Selden, Leasburg, Mesquite, Vado, Berino, La Tuna, Dona Ana, and Mesilla Park, N. Mex.; El Paso and Ysleta, Tex.
Average elevation of irrigable area: 3,700 feet above sea level.
Average annual rainfall on irrigable area: 9½ inches.
Range of temperature on irrigable area: 0° to 100°.

WATER SUPPLY

Source of water supply: Rio Grande.
Area of drainage basin, 37,000 square miles.
Annual run-off in acre-feet of Rio Grande: At San Marcial (30,000 square miles), 1895 to 1910—Maximum, 2,420,000; minimum, 201,000; mean, 1,100,000. At El Paso (38,600 square miles), 1889 to 1893 and 1897 to 1910—Maximum, 2,010,000; minimum, 50,700; mean, 850,000.

[1] Includes Leasburg unit, described in ninth annual report as a separate project

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DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features

Reservoir: Engle—Area, 41,280 acres; capacity, 2,760,000 acre-feet; length of spillway, not determined; elevation of spillway, 200 feet above stream bed.

Storage dam: Engle—Type, rubble concrete gravity; maximum height, 263 feet; length of crest, 1,200 feet; volume, 474,200 cubic yards.

Diversion dams: Type, rubble concrete weir; maximum height, 9 feet; length of masonry, 600 feet; length of earth fill, 1,600 feet; volume, 16,815 cubic yards. Three not designed.

Length of Leasburg Canal: 6 miles, with capacity of 520 second-feet. Other canals not yet designed.

Irrigable area: 155,000 acres in the United States (including 25,000 acres in the Leasburg unit) and 25,000 acres in Mexico, making a total of 180,000 acres.

Present status of irrigable lands (in the United States): 1,423 acres entered under the reclamation act; 11,616 acres withdrawn from entry; 141,961 acres in private ownership.

RESULTS TO JUNE 30, 1911

STORAGE UNIT

Bridges: Number, 3; total length, 1,116 feet.

Buildings: Offices, 1; residences, 24; barns, storehouses, and shops, 22.

Roads: 14 miles.

Telephone lines: 10 miles; telephones in use, 20.

Railroad line: 10½ miles. Cutler on Atchison, Topeka & Santa Fe Railroad to Engle Dam site.

Material excavated: Class 1, earth, 55,786 cubic yards; class 2, indurated material, 7,402 cubic yards; class 3, rock, 134,853 cubic yards.

Cement used: 1,392 barrels.

Concrete placed: 1,387 cubic yards.

LEASBURG UNIT

Canal: 6 miles, with capacity of 520 second-feet.

Diversion dam: Number, 1; volume, 2,318 cubic yards of concrete, 1,878 cubic yards of rock fill.

Dikes: Total length, 1,700 feet; volume, 16,815 cubic yards.

Canal structures: 4, costing more than $2,000 each; 3 costing from $500 to $2,000 each.

Bridges: Wood, 3, with a total length of 150 feet.

Buildings: Residences (one of concrete), 2; barns and storehouses, 2.

Roads: 6 miles.

Telephone lines: 6 miles; telephones in use, 3.

Material excavated: Class 1, earth, 302,082 cubic yards; class 2, indurated material, 1,300 cubic yards; class 3, rock, 570 cubic yards.

Riprap: 520 cubic yards.

Cement used: 2,960 barrels.

Concrete placed: 2,966 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: Leasburg unit, 25,000 acres.

Area irrigated, season of 1911: 25,000 acres.

Length of irrigating season: From February 15 to November 15—274 days.

Character of soil of irrigible area: Fertile alluvium and sandy loam.

Principal products: Alfalfa, corn, wheat, melons, fruits, vegetables.

Prineipal markets: Towns in Texas, New Mexico, Louisiana, and eastern cities.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice. All lands of Leasburg unit are being irrigated under rental contracts.)

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CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys begun in March, 1903.
Construction of Leasburg unit authorized December 2, 1905.
Reclamation act extended to Texas June 12, 1906. (34 Stat., 259.)
Treaty with Mexico providing for distribution of waters of the Rio Grande proclaimed January 16, 1907.
Construction of Engle Dam authorized by Congress and $1,000,000 appropriated March 4, 1907. (34 Stat., 1357.)
Leasburg unit completed July, 1908.
First irrigation by Reclamation Service (Leasburg unit), season of 1908.
Construction of Engle Dam authorized by Secretary May 23, 1910.
Entire project 10 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Rio Grande project provides for the storage of flood waters of the Rio Grande in a reservoir controlled by Engle Dam, about 12 miles west of Engle, N. Mex.; diversion of water from Rio Grande, about 6 miles below the storage dam for the irrigation of lands in Las Palomas Valley; about 24 miles below for watering lands in Rincon Valley; about 60 miles below for the irrigation of 25,000 acres in Mesilla Valley, known as the Leasburg unit, and about 120 miles below for supplying water to lands in El Paso Valley, and the furnishing of 60,000 acre-feet of water per annum for use on land in El Paso Valley on the Mexican side of the Rio Grande. All the irrigation works required for Las Palomas and Rincon Valleys will be new; those for the Leasburg unit include a diversion dam, 6½ miles of canal, and an extension of the existing 25,000-acre canal system to cover all the lands in the Mesilla Valley; and those required for El Paso Valley will supplement and improve present canal systems.

The only features of the above irrigation plan that have been constructed are the diversion dam, headworks, and main canal of the Leasburg unit.

Construction work is in progress on the Engle Dam and the features remaining for future construction are the canal systems for the Palomas, Rincon, and El Paso Valleys and the extension of the Leasburg unit.

CONSTRUCTION DURING FISCAL YEAR

Engle Dam.—The Engle Dam, which will control and regulate the flow of the flood waters of the Rio Grande River, is to be a rubble concrete structure having a maximum height above foundation of 263 feet and a crest length of 1,200 feet between sandstone bluffs at Elephant Butte. The reservoir formed by the dam will have an area of 41,280 acres and a storage capacity of 2,760,000 acre-feet of water.

On June 6, 1910, a board of engineers reported on the general progress of the preliminary work and recommended that the dam be constructed by Government force, and on October 26, 1910, this was authorized by the Secretary of the Interior.

All of the work up to June 30, 1911, has been preliminary to actual construction of the dam itself. This work includes, in addition to diamond drill work at the site of the dam and investigations of an engineering nature, the construction of a railroad about 10½

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miles long from the Atchison, Topeka & Santa Fe Railroad near Engle to the site of the dam, a bridge across the river, telephone lines, permanent office buildings, dwellings, a pump house and well, hospital, mercantile store, and warehouses, mess houses, the assembling of machinery and equipment, the awarding of contracts for the erection of a 2,000-horsepower power plant, and the commencement of the construction of a concrete flume to carry the waters of the river past the site of the dam during excavation and construction of foundations.

Railroad, Cutter to Elephant Butte.—Construction of the railroad to connect with the Atchison, Topeka & Santa Fe Railroad was begun in August, 1910. The contracts for grading and construction of bridges were completed in January, 1911. Track laying by the railroad company was completed on March 1, and the first freight was delivered over the railroad to the Elephant Butte yards on March 2, 1911. The railroad is about 10½ miles in length and involved the excavation of about 80,000 cubic yards of material, and the placing of nearly 350,000 feet b. m. of timber in the construction of bridges and culverts. At the close of the fiscal year three trains a week were being operated over the branch and a gasoline motor car was used for the transportation of passengers.

OPERATION AND MAINTENANCE

During the fiscal year the diversion dam and main canal on the Leasburg unit have been operated to supply water to the community ditches in the Mesilla Valley. A contract is made yearly with the Elephant Butte Water Users' Association by which the Government delivers through its canal to the headgates of the Las Cruces, Dona Ana, and Mesilla ditches, water in such amount as may be available for irrigating 25,000 acres of land in this valley. This is paid for at the rate of 10 cents per acre-foot and during the season of 1910, 89,898 acre-feet were delivered to the water users. There was a shortage of water in the river practically all the time after the last of June, although a small amount of water was delivered, which came from local rains. About 975 farms, aggregating 22,600 acres of land, were irrigated during the year. During the season of 1911, to July 1, 91,272 acre-feet of water have been delivered, and the prospects are very good for water in the river during the entire season. The irrigating period is usually between February 15 and November 15, though, owing to the scarcity of water last year, water was delivered for the fruit trees during the month of January. About 25,000 acres of land are being irrigated.

The only maintenance work done consists of repairs to the dam and canal structures. By increasing the head and velocity of the water in the main canal it has been found that accumulated sediment can be scoured out satisfactorily, thus doing away with the expense of cleaning in the ordinary manner.

SETTLEMENT AND IRRIGATION

The principal crops raised in 1910 were alfalfa, wheat, corn, and cantaloupes. The yield of alfalfa averaged 3 tons and of wheat 32 bushels to the acre, and the average value of the crops was estimated at $37 per acre.

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Crop conditions have been favorable during the season of 1911. The second crop of alfalfa was cut and the wheat was harvested in June and on the 1st of July other crops were in good shape, with ample water supply.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Rio Grande project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1911	Completion due
336	Aug. 27, 1910	George B. Brady.....	Branch railway.....	$51,370.00	$56,291.43	Dec. 24, 1910
337	Aug. 31, 1910	Brown & Conner.....	Railway bridges....	5,400.00	[1] 3,746.35	Dec. 23, 1910
375	May 23, 1911	Beaumont Lumber Co.	Lumber.....	9,741.95	7,119.23	July 11, 1911
390	June 12, 1911	General Electric Co...	Steam power plant..	31,370.00	.....	Aug. 31, 1911

[1] Completed.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Rio Grande project

ASSETS

Inventories:			
Mercantile store		$2,512.14	
Government animals		9,492.13	
Equipment in use	$40,144.65		
Less depreciation	1,158.29		
		38,986.36	
Storehouse		52,576.14	
Cement		730.61	
Lumber		26,885.19	
Explosives		7,311.02	
Forage		1,780.91	
Fuel		648.48	
Cash in office safe		771.67	
Local products		3,573.79	
Freight and handling undistributed		318.61	
			$145,587.05
Cost of work:			
Building cost		956,830.83	
Less adjustments	9,958.43		
Less accrued revenues	31,482.25		
		41,440.68	
			915,390.15
Total assets			1,060,977.20

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$993,286.40		
Transfer vouchers received	57,430.17		
		1,050,716.57	
Collection vouchers	67,296.04		
Transfer vouchers issued	9,103.32		
		76,399.36	
			974,317.21

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Accounts payable:		
Unpaid labor	$17,252.18	
Unpaid purchases	36,968.14	
Unpaid contract estimates	6,321.48	
Unpaid contract holdbacks	6,304.20	
Unpaid freight and express	18,954.84	
Unpaid passenger fares	540.56	
Unredeemed coupon books	300.20	
Unpaid miscellaneous	18.39	
		$86,659.99
Total liabilities		1,060,977.20

Feature costs to June 30, 1911. Rio Grande project

RIO GRANDE UNIT

Preliminary examination:		
Hydrographic surveys		$9,177.99
Topographic surveys and investigations—		
General	$57,498.23	
Soil and cement	1,354.70	
		58,852.93
Canal surveys—		
Messilla Valley	5,450.15	
El Paso Valley	9,260.19	
		14,710.34
Storage works:		
Real estate (rights and property) land submerged	257,754.19	
Examination	18,728.35	
Engineering	10,675.80	
Borings	11,497.14	
Spillway	1,847.66	
		300,503.14
Buildings and plants (construction):		
Main office	8,209.92	
Mess houses	3,024.40	
Engineers' and guests' quarters	2,881.96	
Frame tents (quarters)	924.78	
Cottages and bungalows	10,115.01	
Cottages (13 adobe)	18,169.22	
Corral	1,067.74	
Hospital	3,469.13	
Storehouses and shops	5,947.36	
Miscellaneous buildings (lower town site)	8,000.65	
Miscellaneous buildings (Spring Canyon)	5,396.52	
Main blacksmith shop and equipment (not completed)	53.37	
Main carpenter and machine shops, tool room, and equipment (not completed)	93.27	
Mechanics' mess house	381.27	
Mechanics' quarters	4,087.68	
Temporary and permanent buildings and sheds, at dam site	19,057.94	
Power plant (not completed)	258.50	
Power plant equipment	374.61	
Transmission system (Elephant Butte), light and power	93.20	
Sewerage system	3,125.42	
Water-supply system—		
Wells and pumping plant (town site)	4,822.36	
Wells and pumping plant (dam site)	7,997.11	
Construction of distribution system in general	14,917.53	
		122,468.95
Quarry, sandstone		1,745.61
Mixing and crushing plant:		
Construction (not completed)		33.24
Telephone system:		
Construction		974.80

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Roads and bridges:		
Roads	$36,026.70	
Bridges and culverts	8,190.90	
		$44,217.60
Railroad, Cutter to dam site:		
Surveys	3,348.18	
Grading terminal tracks, buildings, and railroad proper	133,400.98	
Laying rails and ties and ballasting	1,534.81	
Trestlework (Ash and Spring Canyon)	19,639.96	
		157,923.93
Flume (preliminary):		
Excavation		28,065.89
Inventory of unused supplies		2,457.38
Total building cost (Rio Grande unit)		741,131.80

LEASBURG UNIT

Preliminary examination:		
Surveys		5,776.78
Diversion dam:		
Sluiceway and headworks	8,065.95	
Concrete weir and abutment	73,827.41	
Embankment at west end	4,495.91	
		86,389.27
Main canal:		
Excavation, station 0 to 59	31,030.46	
Excavation and structures, station 60 to 309	43,847.98	
Sand sluiceway	6,749.38	
Change of river channel	11,980.59	
		93,608.41
Buildings:		
Concrete house	3,031.66	
Tool house, stable, corral, bunk house, windmill, water tower, fencing, and tents	1,973.41	
		5,005.07
Telephone system:		
Construction		893.44
Real estate (rights and property)		1,556.67
Irrigable lands, farm-unit subdivision		5,994.62
Roads and bridges:		
Roads, construction	234.13	
Bridges, construction	398.08	
		632.21
Total building cost (Leasburg unit)		199,856.47
Operation and maintenance:		
Operation		12,281.46
Maintenance—		
Main canal sluiceway	1,255.73	
Change of river channel	1,146.26	
Canal structures	278.54	
Dam and structures	314.00	
Buildings and plants	566.57	
		3,561.10
Total operation and maintenance cost		15,842.56
Total building and operation and maintenance cost (Leasburg unit)		215,699.03

RECAPITULATION

Building cost:		
Rio Grande	$741,131.80	
Leasburg unit	199,856.47	
		940,988.27
Operation and maintenance cost:		
Leasburg unit		15,842.56
Total building and operation and maintenance cost during construction, as per debit in cost of work in statement of assets and liabilities		956,830.83

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NORTH DAKOTA-MISSOURI RIVER PUMPING PROJECT[1]

LOCATION AND CLIMATIC CONDITIONS

County: Williams.
Townships: 152 to 155 N., Rs. 100 to 104 W., fifth principal meridian.
Railroad: Great Northern.
Railroad stations: Buford, Trenton, Morley, and Williston, N. Dak.
Average elevation of irrigable area: 1,900 feet above sea level.
Average annual rainfall on irrigable area: 15 inches.
Range of temperature on irrigable area: —49° to 107°.

WATER SUPPLY

Source of water supply: Missouri River.
Area of drainage basin: 155,000 square miles.
Mean run-off of Missouri River near Williston, May to October, 1905 to 1907: 15,000,000 acre-feet.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Length of canals: Buford-Trenton unit—6 miles, with capacities from 300 to 50 second-feet; 39 miles, with capacities less than 50 second-feet. Williston unit—3 miles, with capacities from 300 to 50 second-feet; 57 miles, with capacities less than 50 second-feet.
Electric power: Generated by steam power plant near Williston, 1,500 horsepower for Buford-Trenton unit, 1,500 horsepower for Williston unit.
Irrigable area: Buford-Trenton unit (entire unit), 15,035 acres—first division, 4,060 acres; extensions, 1,375 acres; canal B, upper bottom divison, 2,600 acres; canal B, lower bottom division, 4,000 acres; Trenton flat, 3,000 acres. Williston unit (entire unit), 11,147 acres—first division, 8,047 acres; west bottom division, 1,900 acres; east bottom divison, 1,200 acres.
Present status of irrigable lands: Buford-Trenton unit—288 acres entered subject to the reclamation act; 251 acres open to entry; 1,640 acres withdrawn from entry; 411 acres of State lands; 12,445 acres in private ownership. Williston unit—54 acres entered subject to the reclamation act; 289 acres open to entry; 67 acres of State lands; 10,737 acres in private ownership.

RESULTS TO JUNE 30, 1911

BUFORD-TRENTON UNIT

Canals: 1 mile, with capacities from 300 to 50 second-feet; 14 miles, with capacities less than 50 second-feet.
Canal structures: 2 costing more than $2,000 each; 1 costing $2,000 to $500 each; 8 costing less than $500 each.
Bridges: Combination, 4; total length, 68 feet.
Buildings: Office, 1; residences, 3; barns and storehouses, 2.
Pumping stations: Permanent, 1; floating barge, 1.
Telephone lines: 28 miles; telephones in use, 2.
Transmission lines: 29 miles.
Material excavated: Class 1, earth, 69,600 cubic yards; class 2, indurated material, 50 cubic yards.
Paving: 240 square yards.
Cement used: 2,599 barrels.
Concrete placed: 1,654 cubic yards.

WILLISTON UNIT

Canals: 3 miles with capacities 300 to 50 second-feet; 43 miles with capacities less than 50 second-feet.
Canal structures: 8 costing more than $2,000 each; 11 costing $2,000 to $500 each; 22 costing less than $500 each.

[1] Includes Buford-Trenton and Williston units, described in preceding reports as separates projects.

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Bridges: Combination, 12, less than 50 feet in length; total length, 225 feet. Wood, 3, less than 50 feet in length; total length, 31 feet.
Buildings: Offices, 2; residences, 6; barns and storehouses, 5; power station, 1.
Pumping stations: Permanent, 2; floating barge, 1.
Telephone lines: 4 miles; telephones in use, 5.
Transmission lines: 4 miles.
Material excavated: Class 1, earth, 219,100 cubic yards; class 2, indurated material, 16 cubic yards.
Coal mined: 19,493 tons.
Paving: 990 square yards.
Cement used: 3,329 barrels.
Concrete placed: 2,632 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: Buford-Trenton unit, 4,060 acres; Williston unit, 8,047 acres.
Area irrigated, season of 1911: Buford-Trenton unit, 1,240 acres; Williston unit, 3,800 acres.
Length of irrigating season: From June 5 to August 30—87 days.
Character of irrigable area: Ranges from sandy loam to heavy clay gumbo.
Principal products: Small grains, alfalfa, and vegetables.
Principal markets: Local, St. Paul, Minneapolis, and Duluth, Minn.; Chicago, Ill.

LANDS OPENED FOR IRRIGATION

Dates of public notices and orders: Buford-Trenton unit—April 8, 1908; March 9, 1911; May 13, 1911. Williston unit—April 27 and November 30, 1908; April 30, 1909; March 9 and April 14, 1911.
Location of lands opened: Buford-Trenton unit—Tps. 152 and 153 N., Rs. 103 and 104 W., fifth principal meridian. Williston unit—Tps. 154 and 155 N., Rs. 100 and 101 W., fifth principal meridian.
Present status of irrigable lands: Buford-Trenton unit—288 acres entered subject to the reclamation act; 251 acres open to entry; 91 acres of State lands; 3,430 acres in private ownership. Williston unit—54 acres entered subject to the reclamation act; 289 acres open to entry; 67 acres of State land; 7,637 acres in private ownership.
Limit of area of farm units: Public, 80 acres; private, 160 acres.
Duty of water: 2 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $38 under old public notices.
Annual operation and maintenance charge: $0.70 per acre of irrigable land and $0.50 per acre-foot of water actually used under old public notices; $1.50 per acre of irrigable land and $1 per acre-foot of water used order of May 13, 1911.

CHRONOLOGICAL SUMMARY

Reconnaissance and preliminary surveys begun in 1903.
Construction authorized by Secretary, January 23, 1906.
First division, Buford-Trenton unit, completed November, 1907.
Power and pumping plants, Williston unit, completed for present use in the fall of 1907; first division completed in the spring of 1908.
Pumping plant and transmission lines, Buford-Trenton unit, completed for present use in the spring of 1908.
First irrigation by Reclamation Service, season of 1908.
Power installation completed for 2,000 horsepower, June 30, 1910.
Buford-Trenton unit 38 per cent completed June 30, 1911; Williston unit 64 per cent completed June 30, 1911.

IRRIGATION PLAN

The general irrigation plan as constructed provides for a central steam-turbine power plant located near Williston, operating pumps and generating electricity for the operation of other pumps on the Buford-Trenton and Williston units of the project.

On the Buford-Trenton unit water is pumped from the Missouri River with a 30-foot lift into a settling basin by a pumping plant installed on a barge moored in the river. From this settling basin

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a gravity canal supplies water for the irrigation of low lands along the river between Buford and Trenton, and a permanent pumping station raises water 50 feet into a high-line canal for the irrigation of bench lands near the same towns. Both pumping plants are operated by electric power generated at the main power station in the Williston unit and delivered over a transmission line 28.3 miles in length.

The plan of the Williston unit provides for a series of motor-driven centrifugal pumps on a barge in Missouri River; a settling basin receiving water from the barge pumping plant; a main canal extending from the settling basin along Little Muddy Creek to the power plant; a pumping station having electrically driven pumps which lift water from the main canal to a high-line canal, and a second pumping station having electrically driven pumps lifting water from this high-line canal to a higher canal; and two sets of steam-driven pumps located in the central power house, which lift water from the end of the main canal to "E" canal. The canals leading from the several stations deliver water on land in the valley of Little Muddy Creek in the vicinity of Williston. The power station is conveniently located adjacent to a vein of lignite coal, from which fuel is obtained. This station also generates electric power which is delivered over a transmission line to the Buford-Trenton unit. Plans for the complete unit include an extension of the above canal system and the construction of a second intake station, with the necessary canals and laterals to supply water to lands bordering on Missouri River near Williston.

The features of the above irrigation plan which have been completed are: Central power station, coal mine and transmission line. Buford-Trenton unit—Two pumping stations, settling basin, and canal system. Williston unit—Four pumping stations, settling basin, and canal system. No construction work is in progress at the present time. The features remaining for future construction are: Enlargement of power house and installation of additional machinery. Buford-Trenton unit—Extension of high-line canal and low-line canal and lateral system for the irrigation of the bottom land. Williston unit—The east and west bottom canal systems with additional intake and pumping stations.

OPERATION AND MAINTENANCE

During the season of 1910 the power plant, coal mine, transmission line, two barge pumping stations, four permanent pumping stations, settling basins, and portions of the canal systems of each unit, aggregating 40 miles, were operated, and 53 farms aggregating 1,860 acres were irrigated. About 3,000 acre-feet of water was delivered to the land. The barges were launched on May 8 and the operation of the plant commenced May 23. No construction work was carried on, the only work done being of a routine nature in connection with the operation and maintenance of the system.

On June 30, 1911, water was being delivered to 18 farms on the Buford-Trenton unit and 52 farms on the Williston unit. During the fiscal year 6,432 tons of coal were mined. Water-right applications had been received for the delivery of water to 1,240 acres on the Buford-Trenton unit and 3,800 acres on the Williston unit.

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SETTLEMENT AND IRRIGATION

On the Buford-Trenton unit, four farm units were entered during the fiscal year, having an aggregate area of 258 acres, containing 183 acres of irrigable land. The principal crops raised during the season of 1910 were wheat, oats, and alfalfa. The average yield of wheat was 13 bushels per acre, while the average on non-irrigated farms was but 5 bushels. The average yield of oats was 23 bushels and on nonirrigated farms was but 7 bushels per acre. The average yield of alfalfa on the project was 2½ tons per acre. The reason for the small yields during the season of 1910 was in part due to the fact that some of the land irrigated was recently broken and not in good condition and also in the case of wheat, due to the fact that the same crop had been planted for at least two preceding years. This season the crops planted were wheat, oats, flax, barley, alfalfa, and vegetables. The water is being handled to much better advantage than formerly, and crops under irrigation are in excellent condition. The first cutting of alfalfa was made in June.

ORDER DATED MARCH 9, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public, No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section 4 of the reclamation act, and for other purposes," the following order is promulgated for the purpose of relieving the present situation on the Buford-Trenton project, pending the issuing of public notice modifying or abrogating the notices heretofore issued.

2. (*a*) A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment will become effective as to all water-right applications subject to public notices heretofore issued upon the payment of $1.50 per acre on or before March 31, 1911, for operation and maintenance, subject, however, to compliance with the conditions of a public notice to be hereafter issued which will provide for an increased building charge. Before the delivery of any water an additional payment must be made at the rate of $1 per acre-foot for operation and maintenance for all water delivered, payable in advance as deliveries are requested. Such stay of proceedings shall remain in effect until further announcement by means of a public notice or otherwise.

(*b*) Water will also be furnished in the year 1911 to others upon the filing with the project engineer of proper applications, subject to the terms of this order and to the payments and conditions herein provided. No water will be furnished in any case unless the holdings of the applicant for water shall have been conformed to the farm unit shown on the approved farm unit plats.

3. Upon failure to make payment as herein required on or before March 31, 1911, the entry or water-right application, or both, as the case may be, which would otherwise be subject to cancellation, will be promptly canceled without further notice.

4. The pumping barge will not be launched in 1911 until the aggregate payments made to the United States for operation and maintenance for 1911 amount to $3,000, nor until appropriate by-laws or rules and regulations, as called for in letters from the department to the board of directors dated April 28, 1908, and February 27, 1911, shall have been adopted by the Buford-Trenton Water Users' Association. The operation of the pumps will be planned with a view to an approximately uniform rate of delivery of water and for adequate irrigation in the shortest practicable operating period.

5. All applications for water rights filed under the provisions of the notices heretofore issued and for which the payment necessary to avoid cancellation shall be made, will be continued in effect under such prior notices; and water-right applications may be filed on or before March 31, 1911, under the provisions of the public notices heretofore issued if accompanied by the payments required thereunder and shall be entitled to continue under the terms thereof.

6. The intent of this order is to permit all persons who so desire to obtain the benefit of the former building charge of $38 per acre by making the necessary payments or by filing new water-right applications, accompanied by the necessary payments, on or before March 31, 1911; and that all other persons under the project who desire to be furnished with a water supply shall pay the sums herein specified and be subject to the conditions of such public notice as may be hereafter issued.

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ORDER DATED MAY 18, 1911

1. On March 9, 1911, an order was issued for the Buford-Trenton project, North Dakota, providing for a stay of proceedings looking to the cancellation of entries and water-right applications under certain conditions. The said order is hereby modified so as to read as follows:

2. Water-right applicants who, on or before June 15, 1911, comply with the provisions of existing public notices, by making the payments required thereunder on or before that date, shall be permitted to continue under the terms of the former public notices; and water-right applications may be filed on or before June 15, 1911, under the provisions of the public notices heretofore issued, if accompanied by the payments required thereunder, and shall be entitled to continue under the terms thereof.

3. Those who do not avail themselves of the provisions hereinabove stated, whether or not they have filed water-right applications, may receive water for the coming irrigation season by payment of the sum of $1.50 per acre for operation and maintenance charge, of which 50 cents per acre must be paid on or before June 15, 1911, and the balance, $1 per acre, on or before December 1, 1911; and conditioned also upon the payment on or before December 1, 1911, of $1 per acre-foot for all water delivered in 1911. Those who take advantage of these conditions are to be subject to the terms of a public notice to be hereafter published providing for an increased building charge, the amount of which can not be stated at this time.

4. The pumping barge will not be launched in 1911 until the aggregate payments made for operation and maintenance for 1911 at 50 cents per acre shall have amounted to at least $500 for 1,000 acres. The operation of the pumps will be planned with a view to an approximately uniform rate of delivery of water and for adequate irrigation in the shortest practicable operating period, namely, for an irrigation season of 80 days beginning not earlier than June 1 and not later than June 15 and closing not earlier than August 19 and not later than August 30 of each year, and a water supply during each season of 2 acre-feet of water for each acre of land irrigated and cultivated or so much thereof as the water users may require.

5. For the years 1912 and 1913 the terms hereinabove stated will apply to all uncanceled entries or water-right applications, provided, however, that the barge will not be launched in 1912 until payment has been made at 50 cents per acre for operation and maintenance for 1,500 acres and all other amounts due hereunder for the year 1911; and it will not be launched in 1913 until said payment of 50 cents per acre has been made for 2,000 acres, and all other amounts due hereunder for 1912. .

6. Upon failure to make payment as herein required on or before June 15, 1911, the entry or water-right application, or both, as the case may be, which would otherwise be subject to cancellation will be promptly canceled without further notice; and the forfeiture provided for in the reclamation act for failure to pay installments when due will be enforced as to future failure to pay under existing public notices in every case where the provisions of this order are not complied with.

ORDER DATED MARCH 9, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public, No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section 4 of the reclamation act, and for other purposes," the following order is promulgated for the purpose of relieving the present situation on the Williston project, pending the issuing of public notice modifying or abrogating the notices heretofore issued.

2. (*a*) A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment will become effective as to all water-right applications subject to public notices heretofore issued upon the payment of $1.50 per acre on or before March 31, 1911, for operation and maintenance, subject, however, to compliance with the conditions of a public notice to be hereafter issued, which will provide for an increased building charge. Before the delivery of any water, an additional payment must be made at the rate of $1 per acre-foot for operation and maintenance for all water delivered, payable in advance as deliveries are requested. Such stay of proceedings shall remain in effect until further announcement by means of a public notice or otherwise.

(*b*) Water will also be furnished in the year 1911 to others upon the filing with the project engineer of proper applications, subject to the terms of this order and to the payments and conditions herein provided. No water will be furnished in any case unless the holdings of the applicant for water shall have been conformed to the farm unit shown on the approved farm unit plats.

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3. Upon failure to make payment as herein required on or before March 31, 1911, the entry or water-right application, or both, as the case may be, which would otherwise be subject to cancellation, will be promptly canceled without further notice.

4. The pumping barge will not be launched in 1911 until the aggregate payments made to the United States for operation and maintenance for 1911 amount to $9,000. The operation of the pumps will be planned with a view to an approximately uniform rate of delivery of water and for adequate irrigation in the shortest practicable operating period.

5. All applications for water rights filed under the provisions of the notices heretofore issued and for which the payment necessary to avoid cancellation shall have been made on or before March 31, 1911, shall be continued in effect under such prior notices; and water-right applications may be filed on or before March 31, 1911, under the provisions of the public notices heretofore issued if accompanied by the payments required thereunder, and shall be entitled to continue under the terms thereof.

6. The intent of this order is to permit all persons who so desire to obtain the benefit of the former building charge of $38 per acre by making the necessary payments on or before March 31, 1911, or by filing new water-right applications accompanied by the necessary payments on or before that date; and that all other persons under the project who desire to be furnished with a water supply shall pay the sums herein specified and be subject to the conditions of such public notice as may be hereafter issued.

ORDER DATED APRIL 14, 1911

1. On March 9, 1911, an order was issued for the Williston project, North Dakota, providing for a stay of proceedings looking to the cancellation of entries and water-right applications under certain conditions. The said order is hereby modified so as to read as follows:

2. Water-right applicants who, on or before May 10, 1911, comply with the provisions of existing public notices, by making the payments required thereunder on or before that date, shall be permitted to continue under the terms of the former public notices; and water-right applications may be filed on or before May 10, 1911, under the provisions of the public notices heretofore issued, if accompanied by the payments required thereunder, and shall be entitled to continue under the terms thereof.

3. Those who do not avail themselves of the provisions hereinabove stated, whether or not they have filed water-right applications, may receive water for the coming irrigation season by payment of the sum of $1.50 per acre for operation and maintenance charge, of which 50 cents per acre must be paid on or before May 10, 1911, and the balance, $1 per acre, on or before December 1, 1911, and conditioned also upon the payment on or before December 1, 1911, of $1 per acre-foot for all water delivered in 1911. Those who take advantage of these conditions are to be subject to the terms of a public notice to be hereafter published providing for an increased building charge, the amount of which can not be stated at this time.

4. The pumping barge will not be launched in 1911 until the aggregate payments made for operation and maintenance for 1911 at 50 cents per acre shall have amounted to at least $1,000 for 2,000 acres. The operation of the pumps will be planned with a view to an approximately uniform rate of delivery of water and for adequate irrigation in the shortest practicable operating period, namely, for an irrigation season of 80 days beginning not earlier than June 1 and not later than June 15 and closing not earlier than August 19 and not later than August 30 of each year, and a water supply during each season of 2 acre-feet of water for each acre of land irrigated and cultivated, or so much thereof as the water users may require.

5. For the years 1912 and 1913 the terms hereinabove stated will apply to all uncanceled entries or water-right applications; provided however, that the barge will not be launched in 1912 until payment has been made at 50 cents per acre for operation and maintenance for 3,000 acres and all other amounts due hereunder for the year 1911, and it will not be launched in 1913 until said payment of 50 cents per acre has been made for 4,000 acres and all other amounts due hereunder for 1912.

6. Upon failure to make payment as herein required on or before May 10, 1911, the entry or water-right application, or both, as the case may be, which would otherwise be subject to cancellation will be promptly canceled without further notice; and the forfeiture provided for in the reclamation act for failure to pay installments when due will be enforced as to future failure to pay under existing public notices in every case where the provisions of this order are not complied with.

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Missouri River pumping project

ASSETS

Accounts receivable:			
Uncollected water-right building charges		$98,024.06	
Uncollected water-right operation and maintenance charges		17,363.85	
			$115,387.91
Inventories:			
Mercantile store		695.31	
Government animals		1,171.66	
Equipment in use	$14,567.31		
Less depreciation	383.26		
		14,184.05	
Storehouse		398.67	
Iron and steel		685.19	
Forage		135.12	
Fuel		927.94	
Local products		53.32	
Unadjusted transfers		.17	
Freight and handling undistributed		7.50	
			18,258.93
Cost of work:			
Building cost	713,414.06		
Plus adjustments	276.26		
		713,690.32	
Less adjustments	964.12		
Less accrued revenues	5,789.80		
		6,753.92	
			706,936.40
Operation and maintenance cost		135,732.26	
Less accrued revenues		196.75	
			135,535.51
Total assets			976,118.75

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$856,673.37		
Transfer vouchers received	173,543.38		
		1,030,216.75	
Collection vouchers	17,003.01		
Transfer vouchers issued	167,739.01		
		184,742.02	
			845,474.73
Accounts payable:			
Unpaid labor		4,336.62	
Unpaid purchases		323.30	
Unpaid freight and express		222.77	
Unpaid passenger fares		30.10	
Unredeemed coupon books		15.20	
Unredeemed meal tickets		55.25	
Unpaid miscellaneous		432.72	
			5,415.96
Repayments accrued:			
Building		100,601.18	
Operation and maintenance		24,626.88	
			125,228.06
Total liabilities			976,118.75

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Feature costs to June 30, 1911, Missouri River pumping project

WILLISTON UNIT

Coal mine development		$12,529.73
Power plant:		
Power-house building and machinery, station No. 1	$156,210.90	
Transmission line	14,833.12	
Transformer station at barge	2,446.22	
Pumping barge, station No. 3	35,098.15	
Pumping station No. 2	12,459.37	
Pumping station No. 4	7,332.92	
Floating boom at barge	686.03	
Scow pontoon	1,247.23	
		230,313.94
Distributing system (earthwork and structures):		
Canals and laterals	121,371.64	
Equalizing reservoir	1,071.87	
Spillway at reservoir	502.08	
Turnout at reservoir	217.00	
Diverting structures	565.34	
Sluicing boat	763.32	
Bank protection at settling basin	102.83	
Bank revetment, Missouri River	1,598.63	
		126,192.71
Buildings:		
Incidental structures	4,405.64	
Engineer's cottage at power house	1,385.16	
Storehouse and granary	251.21	
Temporary machine shop	683.07	
Bathhouse at mine	612.27	
Bunk houses at power station	1,211.27	
Coal-storage structure	823.83	
Barn at power station	801.67	
Mess house at power station	162.28	
Office at power station	533.19	
Commissary building at power station	552.38	
		11,421.97
Real estate (rights and property), lands purchased		4,639.02
Irrigable lands:		
Soil survey	136.96	
Farm-unit survey	5,742.17	
Survey, east and west bottom	986.24	
Land-restoration survey	712.89	
Town-site survey	127.60	
		7,705.86
Examination of project as a whole, preliminary surveys		22,541.64
Administration of project as a whole, general expense		38,746.21
Total building cost		454,091.08
Operation and maintenance:		
Power plant—		
Station No. 1	53,103.34	
Pumping station No. 2	2,162.84	
Pumping station No. 3	15,285.54	
Pumping station No. 4	1,493.86	
Transmission line	699.02	
Telephone line	496.04	
		73,240.64
Distribution system:		
Canal	10,243.21	
Settling basin	371.27	
		10,614.48
Miscellaneous:		
General expense	2,240.37	
Camp at power house	757.66	
Coal mine	740.58	
		3,738.61
Total operation and maintenance cost		87,593.73
Total building and operation and maintenance cost of unit		541,684.81

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BUFORD-TRENTON UNIT

Power plant:		
Excavation	$971.45	
Concrete	8,751.56	
Reenforcing steel	179.76	
Structural steel	685.91	
Roofing	1,317.04	
Millwork	518.10	
Water conduits	1,042.98	
Machinery, installing and testing	54,358.96	
Temporary end in boiler room	385.44	
Transmission line	23,380.90	
Pumping barge and ways	32,691.41	
Pumping station	32,277.62	
Boom and scow pontoon	701.35	
		$157,262.48
Distributing system:		
Settling basin	6,655.75	
Brush mattress	117.42	
Concrete pressure pipe	19,504.25	
Canals and structures	23,060.62	
Canal B	2,168.10	
Six Mile flume	708.54	
		52,214.68
Preliminary survey:		
General preliminary cost	11,036.36	
Survey	5,737.08	
Survey, soil	90.73	
Investigation, stone quarry	140.90	
Water system	930.98	
Land restoration	49.43	
		17,985.48
Real estate		943.73
Buildings:		
Incidental structures	1,156.16	
Electrician's cottage	332.91	
Engineer's cottage	1,293.93	
Bunk house	343.95	
Coal shed	120.00	
Water-tank house	235.50	
		3,482.45
Administration of project as a whole, general expense		27,434.16
Total building cost		259,322.98
Operation and maintenance:		
Power plant—		
Station No. 1	6,381.60	
Station No. 2	1,824.40	
Williston power house	26,355.54	
Transmission line	1,938.16	
Telephone line	619.27	
		37,118.97
Distributing system:		
Canal	3,999.18	
Settling basin	44.65	
		4,043.83
Miscellaneous:		
General expense	6,934.43	
Demonstration farm	41.30	
		6,975.73
Total operation and maintenance cost		48,138.53
Total building and operation and maintenance cost		849,146.32

RECAPITULATION

Building cost:		
Williston unit	454,091.08	
Buford-Trenton unit	259,322.98	
		713,414.06

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Operation and maintenance cost:		
Williston unit	$87,593.73	
Buford-Trenton unit	48,138.53	
		$135,732.26
Total building and operation and maintenance cost as per debit in cost of work in statement of assets and liabilities		849,146.32

OKLAHOMA, CIMARRON PROJECT

IRRIGATION PLAN

The irrigation plan of the Cimarron project, so far as it can be outlined from the limited investigations and surveys heretofore made, provides for the storage of flood waters of Cimarron River or the utilization of the underflow of the Cimarron River valley, or both, for use in irrigating lands in Beaver and Woodward Counties, Oklahoma. The investigations made, however, indicate that the feasibility of such a project is doubtful.

INVESTIGATIONS

In 1902 and 1903 reconnoissance was made of the Cimarron River with special reference to possible reservoir sites. In 1904 a plane table survey was made of a reservoir site on Cimarron River 2½ miles northeast of Kenton, Okla., and other reservoir sites were examined and some investigations of underground waters made. Beginning in 1906 and continuing until 1909, further examinations of reservoir sites and water supply and studies of the underflow of the valley by means of test borings were carried on, and topographic surveys of lands along the Cimarron River were made, resulting in the conclusion that present construction of an irrigation project would not be feasible.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Cimarron project

ASSETS

Inventories: Storehouse			$125.00
Cost of work: Building cost			8,755.79
Total assets			8,880.79

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$8,577.96		
Transfer vouchers received	321.76		
		$8,899.72	
Transfer vouchers issued		26.55	
			8,873.17
Accounts payable: Unpaid passenger fares			7.62
Total liabilities			8,880.79

Feature costs to June 30, 1911, Cimarron project

Examination of project as a whole: Preliminary examination and surveys	$8,755.79

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OREGON, CENTRAL OREGON PROJECTS

IRRIGATION PLAN

The Central Oregon projects consist of a number of possible irrigation developments in the State of Oregon, located in the Deschutes, Snake, and Columbia River Basins and in the interior basin. The irrigation plan of these projects provides in general for utilization of the waters of various small streams in these drainage basins.

INVESTIGATIONS

A reconnoissance was made in 1903 of some of the streams and irrigable areas of these projects, and stream measurements and investigations of water supply have been carried on since that date.

In 1908 a reconnoissance, covering in part projects previously reported on but much more complete and thorough than investigations previously attempted, was made in central and eastern Oregon. Irrigation projects on Crooked, Ochoco, Tumalo, and Rosland Rivers, in the Deschutes River Basin; on the Chewaucan, Ana, Pauline, Rock Fort, Silvies, and Blitzen Rivers, and Silver Creek, in the interior basin; on Powder River, in the Snake River Basin; and on the John Day and Umatilla Rivers, in the Columbia River Basin, were investigated with considerable care; and new gaging stations were established along the more important streams.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Central Oregon projects

ASSETS

Inventories: Equipment in use			$85.98
Cost of work:			
Building cost	$40,293.10		
Plus adjustments	37.59		
		40,330.69	
Total assets			40,416.67

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$43,014.03		
Transfer vouchers received	1,744.30		
		44,758.33	
Collection vouchers	1,278.58		
Transfer vouchers issued	3,063.08		
		4,341.66	
Total liabilities			40,416.67

Feature costs to June 30, 1911, Central Oregon projects.

Preliminary examination and surveys	$40,293.10

OREGON, UMATILLA PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Umatilla.
Townships: 4 and 5 N., Rs. 28 and 29 E., Willamette meridian.
Railroads: Oregon Railroad & Navigation Co.; Northern Pacific.

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Railroad stations: Hermiston and Umatilla.
Average elevation of irrigable area: 470 feet above sea level.
Average annual rainfall on irrigable area: 7½ inches.
Range of temperature on irrigable area: −28° to 115°. (Ordinary minimum, 0°.)

WATER SUPPLY

Source of water supply: Umatilla River.
Area of drainage basin: 1,610 square miles.
Annual run-off in acre-feet of Umatilla River at Yoakum (1,200 square miles), 1903 to 1910: Maximum, 694,000; minimum, 250,000; mean, 508,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoir: Cold Springs—area, 1,500 acres; capacity, 50,000 acre-feet; length of spillway, 330 feet; elevation of spillway, 90 feet above stream bed.
Storage dam: Cold Springs—type, earth fill; maximum height, 98 feet; length of crest, 3,800 feet; volume, 757,000 cubic yards earth and gravel, 32,500 cubic yards rock fill, and 3,900 cubic yards concrete.
Diversion dam: Type, concrete weir; maximum height, 2.5 feet; length of masonry, 400 feet; length of earth fill, 780 feet; volume, 296 cubic yards concrete, 6,400 cubic yards earth, 810 cubic yards rock fill.
Length of canals: 25 miles with capacities greater than 300 second-feet; 13 miles with capacities from 300 to 50 second-feet; 110 miles, with capacities less than 50 second-feet.
Tunnels: Number, 1; length, 34 feet.
Dikes: Aggregate length, 1,400 feet.
Water power: Drainage outfall, 75 horsepower (not developed).
Irrigable area: Entire project, 25,000 acres; Hermiston unit, 6,975 acres; second unit, 4,350 acres; third unit, 3,950 acres; fourth unit, 1,976 acres; extensions, 7,749 acres.
Present status of irrigable lands (entire project): 10,699 acres entered subject to the reclamation act; 251 acres open to entry; 1,746 acres withdrawn from entry; 38 acres of State lands; 12,266 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 25 miles with capacities from 301 to 800 second-feet; 13 miles with capacities from 50 to 300 second-feet; 74 miles with capacities less than 50 second-feet (including pipe lines).
Storage dams: Volume—masonry, 3,900 cubic yards; earth, 757,000 cubic yards; rock fill, 32,500 cubic yards.
Diversion dams: Volume—masonry, 296 cubic yards; earth, 6,400 cubic yards; rock fill, 810 cubic yards.
Dikes or levees for protection from overflow: Total length, 1,400 feet; volume, 8,000 cubic yards.
Canal structures: 13 costing more than $2,000 each; 7 costing from $500 to $2,000 each; 740 costing less than $500 each.
Bridges: Steel, 1; total length, 185 feet. Wood, 30 less than 50 feet in length each; total length, 700 feet. Concrete, 1; length, 31 feet.
Buildings: Offices, 1; residences, 6; barns and storehouses, 6.
Roads: 6½ miles.
Telephone lines: Local company supplies service. Telephones in use, 15.
Material excavated: Class 1, earth, 2,150,000 cubic yards; class 2, indurated material, 88,000 cubic yards; class 3, rock, 41,500 cubic yards.
Riprap: 34,500 cubic yards.
Paving: 4,200 square yards.
Cement used: 24,370 barrels.
Concrete placed: 17,840 cubic yards.
Concrete pipe manufactured: 90,316 linear feet, 6 to 46 inches diameter.

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AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 17,252 acres.
Area irrigated, season of 1911: 8,600 acres.
Length of irrigating season: From March 20 to October 16—210 days.
Character of soil of irrigable area: Sandy loam and volcanic ash.
Principal products: Alfalfa, fruits, berries, vegetables.
Principal markets: Portland, Oreg., and Spokane, Wash.

LANDS OPENED FOR IRRIGATION

Dates of public notices and orders relating thereto: December 27, 1907; August 3, 1908; November 12, 1908 (two); April 3, 1909; January 6, 1910 (two); July 2, 1910; February 28 and May 16, 1911.
Location of lands opened: Ts. 4 and 5 N., Rs. 28 and 29 E., Willamette meridian.
Present status of irrigable lands opened: 8,195 acres entered subject to the reclamation act; 251 acres open to entry; 8,806 acres in private ownership; 227 acres withdrawn from entry.
Limit of area of farm units: Public, 40 acres; private, 160 acres.
Duty of water: 2.8 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $60.
Annual operation and maintenance charge: $1.30 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys begun in 1905.
Board report October 27, 1905.
Construction authorized by Secretary December 4, 1905.
Diversion dam and feed canal completed August, 1907.
Cold Springs Dam completed June, 1908.
Hermiston unit completed June, 1908.
Maxwell Canal system purchased June 4, 1908.
First irrigation by Reclamation Service, season of 1908.
Entire project, exclusive of west extension, 78 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Umatilla project provides for the diversion of water from the Umatilla River by a dam about 2 miles above Echo, Oreg., through a supply or feed canal into a storage reservoir controlled by Cold Springs Dam and the diversion of water from the storage reservoir through an outlet canal, and from the feed canal by means of a by-pass canal connecting the feed and outlet canals and from the Umatilla River by the Maxwell Canal, heading near Butter Creek, into distributing systems watering lands in the Umatilla and Columbia River Valleys near Hermiston, Oreg.

The features of the above irrigation plan which have been completed are: The diverting works, feed canal, Cold Springs Dam, by-pass and outlet canals, the distributing system embracing the first, second, and third units, and a number of drainage ditches. The only construction work in progress at present is the placing of concrete lining in portions of the supply canal.

The features remaining for future construction embrace the watering of lands lying between the feed canal and the present distributing system by means of direct pumping; the watering of lands lying above the present distributaries by means of electric pumping from power to be developed at the outfall of the drainage ditch and at other points; the construction of distributaries to supply outlying lands near the Columbia River which will be included in future units; further lining of canals and the completion of the drainage system.

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The construction of the proposed west extension, which embraces an area on the west side of the Umatilla River of from 10,000 to 50,000 acres in extent, will probably be undertaken at a later date.

CONSTRUCTION DURING FISCAL YEAR

Feed Canal.—The sides of the Feed Canal were lined with concrete for a distance of 4,903 linear feet by Government forces during the fiscal year ending June 30, 1911. The total length of full concrete lining in the feed canal on June 30, 1911, was 8,024 linear feet, and the total length of side concrete lining was 8,678 linear feet.

Cold Springs Dam.—Two hundred and fifty linear feet of 8-inch cement drain pipe were placed on the west side of Cold Springs Dam to facilitate the handling of seepage water. Two 36-foot steel spans of the footbridge leading to the gate tower were replaced by a 72-foot steel through-truss span, and a steel trestle bent 36 feet high was removed. A concrete pier containing 14 cubic yards was built at steel trestle bent No. 2 to prevent damage from ice. Flashboards with steel supports were placed on the spillway.

Distribution system.—During the past year 8 miles of canals and laterals were constructed, involving the excavation of 42,385 cubic yards of material, and the laying of 3,960 linear feet of 30-inch concrete pipe, 1,984 linear feet of 16-inch concrete pipe, 3,550 linear feet of 12-inch concrete pipe, and 760 linear feet of 12-inch wood-stave pipe. A total amount of 19,660 cubic yards of material was excavated by contract and the remainder of the work was done by Government forces.

Other excavation by Government forces included the following: The enlargement and reconstruction of portions of the A Canal, 24,000 cubic yards; the reconstruction of a portion of the Maxwell Canal, 3,400 cubic yards; and the construction of the main drainage ditch north of Hermiston, 9,650 cubic yards. A second drainage ditch, about three-fourths of a mile in length 5 miles northeast of Hermiston, involving the excavation of 14,000 cubic yards, was constructed by contract, and 3,200 linear feet of timber lining were placed therein by Government forces. In various canals of the distribution system 3,401 linear feet of full concrete lining and 2,680 linear feet of side concrete lining were placed. Concrete structures at A–C drop and at the head of R Canal were enlarged by the construction of an additional port in each structure. A concrete spillway was constructed on the Maxwell Canal to replace the timber structure damaged by washout, and small concrete structures were built on other parts of the system. Two concrete turnouts for farm laterals, cast in sections and assembled in the field as an experiment, proved to be both satisfactory and economical.

OPERATION AND MAINTENANCE

During the season of 1910 the entire system, including 87 miles of canals, was operated; and 208 farms, aggregating 2,574 acres in the units opened, were irrigated. Water was diverted through the feed canal from November, 1909, until June, 1910, the maximum discharge being 300 second-feet and the total amount of diversion being 68,000 acre-feet of water, of which 57,500 acre-feet were deliv-

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ered to the reservoir, and 41,300 acre-feet were delivered from the reservoir to the distribution system. The Maxwell Canal was operated from May 26 to June 16, 1,600 acre-feet being diverted from the Umatilla River. Due to the sandy nature of the soil the loss from seepage was heavy, and the delivery of water was interrupted in a few places due to high winds filling the distributaries with drifting sand. These difficulties will soon disappear with the rapid developemnt of the project and the growth of vegetation. In the fall a thorough cleaning of the canals was carried out, and the banks were seeded and protected with brush.

For the irrigation season of 1911 delivery of water through the feed canal was resumed on November 7, 1910, and continued until the middle of June, 1911, when a total of 81,265 acre-feet of water had been diverted, of which 71,200 acre-feet were delivered to the reservoir The reservoir was filled on May 1 for the first time since its completion in 1908. About 25,000 acre-feet of water were diverted from the reservoir for irrigation up to June 30, 1911, and on that date 41,100 acre-feet of stored water were available. The diversion of water through the Maxwell Canal system amounted to 6,826 acre-feet from March 30 to June 30, 1911.

SETTLEMENT AND IRRIGATION

During the fiscal year the settlement of the project has shown a satisfactory advance. Only 16 homesteads remain vacant on the project. The settlement of patented land has been slower than the homestead sections, although many of the purchasers of Maxwell lands have taken up a residence on their holdings. At the close of the irrigation season of 1910 the estimated value of buildings and other improvements on the project was $386,649, and the estimated value added to the land by reason of cultivation and establishment of growths such as alfalfa, orchard, etc., was $197,609. The number of people living on the project outside the platted portion of Hermiston was 475; number of people living in the platted portion of Hermiston was 460; total population on the project was 935.

During the irrigating season of 1910 no revenue was derived from orchard products. Local consumers took practically all the alfalfa grown, and vegetables were not grown in sufficient quantities to meet even a small part of the local demand. Alfalfa, for which there is a good market, seems to be well adapted to conditions on the project, and the average yield on well-established fields was 5 tons to the acre.

During the irrigating season of 1911 the acreage seeded to alfalfa and set to orchard has materially increased. Many of the orchards set out in 1908 and 1909 show a very satisfactory growth, and the indications are that peach orchards will bear next year. Many of the settlers have had success with early potatoes, and several tons were shipped to Pendleton and other towns.

At the close of the present fiscal year the area irrigated was about 3,500 acres, and the area covered by water-right applications was about 12,664 acres.

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PUBLIC NOTICE DATED JULY 2, 1910

1. The public notices and orders heretofore issued under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), affecting the irrigable lands within the Umatilla project, Oregon, provide that the installments of charges for building, operation, and maintenance for the irrigable lands therein referred to become due on December 1 of the years stated therein. Such provisions are hereby affirmed as to water-right applications heretofore made.

2. As to lands in private ownership or lands entered prior to the dates of said notices, all installments of the charges for building, operation, and maintenance which have accrued for prior years under the provisions of the public notices and orders must be paid at the time of filing water-right application therefor.

3. All entries made hereafter for any and all of the lands shown on the approved plats of said project, whether for lands not heretofore entered or for lands covered by prior entries which have been canceled by relinquishment or otherwise, must be accompanied by applications for water rights in due form and by an amount equal to the sum of all unpaid (or paid and unassigned) installments for building, operation, and maintenance which have accrued against the land for prior years.

PUBLIC NOTICE DATED FEBRUARY 28, 1911

1. Pursuant to the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), notice is hereby given as follows:

2. Water will be furnished from the fourth unit, Umatilla project, Oregon, under the provisions of the reclamation act, in the irrigation season of 1911, for the irrigable areas shown on the farm unit plats of Tps. 4 and 5 N., R. 28 E., and T. 5 N., R. 29 E., Willamette meridian, approved by the Secretary of the Interior, February 11, and on file in the local land office at La Grande, Oreg.

3. Homestead entries, accompanied by applications for water rights and, as hereinafter provided, by the appropriate installment or installments of the charges for building, operation, and maintenance, may be made on and after March 22, 1911, beginning at 9 o'clock a. m., under the provisions of said act for the farm units shown on said plats. Water-right applications may also be made for lands heretofore entered and for lands in private ownership, and the time when payments will be due therefor is hereinafter stated.

4. Warning and notice are hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun prior to March 23, 1911, on any land shown on said plats and all such settlement or occupation, filing, or entry is hereby forbidden; provided, however, that this shall not interfere with any valid existing rights obtained by settlement or entry while the land was subject thereto.

5. The limit of area per entry, representing the acreage which in the opinion of the Secretary of the Interior may be reasonably required for the support of a family on the lands entered subject to the provisions of the reclamation act, is fixed at the amounts shown upon the plats for the several farm units.

6. The maximum limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

7. The charges which shall be made per acre of irrigable land in the farm units shown on said plats, subject to entry hereunder on and after March 22, 1911, and for lands heretofore entered or in private ownership for which water will be furnished during the irrigation season of 1911 as aforesaid, are in two parts, as follows:

(*a*) The building of the irrigation system, $60 per acre of irrigable land, payable in not more than 10 annual installments, each payment not less than $6 or some multiple thereof per acre, except that in the case of lands hereafter entered the first installment of the building charge shall be $12 per acre and subsequent installments $6 per acre. Full payment may be made at any time of any balance of the building charge remaining due, after certification by the Commissioner of the General Land Office that full and satisfactory compliance has been shown with all the requirements of the law as to residence, cultivation, and reclamation.

(*b*) For operation and maintenance for the irrigation season of 1911, and annually thereafter until further notice, $1.30 per acre of irrigable land, whether water is used thereon or not.

8. All entries made hereafter for any of the lands described, whether for lands not heretofore entered, or for lands covered by prior entries which have been canceled by

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relinquishment or otherwise, shall be accompanied by applications for water rights in due form and by the first installment of the charges for building, operation, and maintenance, not less than $13.30 per acre of irrigable land, except where payments have been duly made by the prior applicants and credits therefor duly assigned in writing. The second installment of the building charge, not less than $6 per acre, and the appropriate charge for operation and maintenance, shall become due on December 1 of the following year. Subsequent installments of the building charge shall become due on December 1 of each year thereafter until fully paid. All entries made and all water-right applications filed after March 22, 1911, for public or private lands shall be accompanied by a payment equal to the sum of all installments which would have become due had the entry or water-right application been filed on March 22, 1911, or which in the case of a prior application were paid and were not duly assigned in writing.

9. For lands in private ownership and for lands heretofore entered, the first installment of the charges for building, operation, and maintenance, not less than $7.30 per acre of irrigable land, shall become due on December 1, 1911. The second installment shall be due on December 1, 1912. Subsequent installments shall become due on December 1 of each year thereafter. In cases where applications for water rights are made for said lands after one or more installments of the charges thereon for building, operation, and maintenance have become due hereunder, all installments of such charges which have thus accrued must be paid at the time of filing such applications for water rights.

10. The first and all subsequent installments of the charges for all irrigable areas shown on these plats, whether or not water is used thereon, shall be due and payable as herein provided.

11. The regulation is hereby established that no water will be furnished in any year until the portions for operation and maintenance of all installments then due shall have been paid. Accordingly, no water will be furnished for the irrigation season of 1912 for any lands unless the portion for operation and maintenance of the installment due December 1, 1911, has been paid and in like manner no water will be furnished in any subsequent irrigation season unless payment has been made of the portions of the installments for operation and maintenance then due and unpaid.

12. Failure to pay any two installments of the charges when due, whether on entries made subject to the reclamation act, or on water-right applications for other lands, shall render such entries and the corresponding water-right applications, or the water-right applications for other lands, subject to cancellation with the forfeiture of all rights under the reclamation act, as well as of any moneys already paid.

13. All charges must be paid at the local land office, at La Grande, Oreg.

14. The charges may, for the convenience of applicants, be handed to the special fiscal agent of the United States Reclamation Service assigned to the Umatilla project, for transmission to the register and receiver of the local land office, but in case this privilege is availed of the necessary charges for transportation of the cash, as determined by the special fiscal agent, must accompany said water-right charges.

ORDER DATED MAY 16, 1911

1. In pursuance of the act of Congress approved February 13, 1911, entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section 4 of the reclamation act, and for other purposes," the terms and conditions of the public notices for lands irrigable under the Umatilla project, Oregon, constructed in pursuance of the reclamation act of June 17, 1902 (32 Stat., 388), issued December 27, 1907, November 12, 1908, April 3, 1909, January 6, 1910, and February 28, 1911, and all orders and notices amendatory thereof or supplementary thereto, in so far as the same relate to the time when installments shall be due and payable for lands designated therein, and shown upon the farm-unit plats accompanying the same, are hereby modified as follows:

2. The installment of the charges for building, operation, and maintenance which, under aforesaid notices and orders and notices amendatory thereof or supplementary thereto, are due on December 1, 1911, shall become due on March 1, 1912. The installments of said charges for subsequent years shall be due on March 1 of each year.

3. The terms and conditions of aforesaid public notices and of all orders and notices amendatory thereof or supplementary thereto shall remain in full force and effect except as modified herein.

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Umatilla project

ASSETS

Accounts receivable:			
Uncollected water-right building charges		$58,494.14	
Uncollected water-right operation and maintenance charges		3,704.96	
			$62,199.10
Inventories:			
Equipment in use		29,230.84	
Storehouse		654.37	
Cement		755.57	
Iron and steel		41.76	
Lumber		1,362.82	
Explosives		18.08	
Forage		709.70	
Fuel		410.57	
Cash in office safe		19.00	
			33,202.71
Cost of work:			
Building cost	$1,232,680.59		
Plus adjustments	209.85		
		1,232,890.44	
Less adjustments	1,319.29		
Less accrued revenues	1,798.82		
		3,118.11	
			1,229,772.33
Operation and maintenance cost		95,179.14	
Less accrued revenues		2,292.20	
			92,886.94
Total assets			1,418,061.08

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$1,387,628.61		
Transfer vouchers received	39,961.47		
		1,427,590.08	
Collection vouchers	177,052.91		
Transfer vouchers issued	44,145.86		
		221,198.77	
			1,206,391.31
Accounts payable:			
Unpaid labor		5,631.33	
Unpaid purchases		1,756.68	
Unpaid freight and express		567.90	
Unpaid passenger fares		390.55	
			8,346.46
Repayments accrued:			
Building		171,649.65	
Operation and maintenance		31,673.66	
			203,323.31
Total liabilities			1,418,061.08

Feature costs to June 30, 1911, Umatilla project.

Storage works:	
Cold Springs Dam	$373,441.00
Buildings at dam	12,772.15
Inlet works	13,163.58
Main spillway	33,998.89
Feed canal near dam	2,426.58
Outlet works	6,764.79
	$442,566.99

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Storage feed canal:		
Diversion works and canal	$241,732.08	
Repairing and priming	12,370.84	
Wasteways	7,221.59	
Bridges and crossings	1,283.06	
Concrete lining and cut-off wall	30,028.73	
Buildings	2,864.40	
		$295,500.70
Distribution system:		
Canals and laterals	82,389.98	
By-pass drops, turnouts, and miscellaneous structures	35,965.12	
Pipe lines	185,363.78	
Crossings and bridges	5,203.89	
Priming canals	3,381.84	
Subdivision of land	1,084.81	
Reconstruction and repairs, old Maxwell system	2,706.09	
Drainage	23,488.36	
Lining canals	7,643.37	
		347,227.24
Demonstration farm: Barns, other buildings, and fences		3,421.47
Real estate (rights and property), lands purchased		48,467.67
Buildings, Hermiston		7,870.03
Examination of project as a whole:		
Surveys	20,552.00	
Designs	4,404.00	
		24,956.00
West branch of project, canal		25,729.32
West extension—examination and investigation:		
Topographic surveys, irrigable lands	12,059.89	
Soil investigation	1,301.98	
Miscellaneous reconnaissance	579.26	
Right of way (investigation)	738.46	
Studies and computation	1,386.99	
Dam-site investigation	14,596.59	
Reservoir-site surveys	2,289.55	
		32,952.72
Inventory of unused supplies		3,988.45
Total building cost		1,232,680.59
Operation and maintenance:		
Feed canal and reservoir protection	32,654.43	
Distributing laterals	48,069.07	
Pipe-line protection	1,016.89	
Cottages—repairs and additions	229.79	
Headquarters and other buildings	1,125.93	
General expense	12,083.03	
		95,179.14
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		1,327,859.73

OREGON-CALIFORNIA, KLAMATH PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Klamath, Oreg.; Siskiyou and Modoc, Cal.
Townships: 38 to 41 S., Rs. 8 to 14 E., Willamette meridian; 46 to 48 N., Rs. 1 to 8 E., Mount Diablo meridian.
Railroad: California Northeastern.
Railroad stations: Klamath Falls, Midland, and Ady, Oreg.
Average elevation of irrigable area: 4,100 feet above sea level.
Average annual rainfall on irrigable area: 15 inches.
Range of temperature on irrigable area: −5° to 100°.

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WATER SUPPLY

Source of water supply: Upper Klamath Lake and Clear Lake.
Area of drainage basin: 3,700 square miles.
Annual run-off in acre-feet, 1904 to 1909: Link River at Klamath Falls—maximum, 2,150,000; minimum, 1,450,000; mean, 1,810,000. Lost River at Clear Lake—maximum, 251,000; minimum, 34,800; mean, 122,000. Lost River at Merrill—maximum, 475,000; minimum, 151,000; mean, 300,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoirs: Upper Klamath Lake—area, 60,000 acres; capacity, 200,000 acre-feet. Clear Lake—area, 25,000 acres; capacity, 462,000 acre-feet; length of spillway, 357 feet; elevation of spillway, 24 feet above stream bed.
Storage dam: Clear Lake—type, rock fill; maximum height, 33 feet; length of crest, 790 feet; volume, earth, 23,100 cubic yards; rock, 33,500 cubic yards.
Diversion dam: Lost River—type, hollow reenforced concrete; maximum height, 40 feet; length of masonry, 280 feet; length of earth fill, 400 feet; volume—concrete, 5,300 cubic yards; earth fill, 15,000 cubic yards.
Length of canals now constructed: 10 miles with capacities greater than 300 second-feet; 34 miles with capacities from 300 to 50 second-feet; 101 miles with capacities less than 50 second-feet.
Tunnel: Length, 3,297 feet.
Dikes: Aggregate length, 2,800 feet, exclusive of marsh reclamation.
Power development: Not determined.
Irrigable area: Entire project, 72,000 acres. First unit, 30,000 acres; second unit, 7,000 acres; Tule Lake, 35,000 acres.
Present status of irrigable land: 44 acres entered subject to the reclamation act; 23 acres open to entry; 32,000 acres withdrawn from entry; 40,000 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 9 miles with capacities of more than 800 second-feet; 1 mile with capacities from 301 to 800 second-feet; 34 miles with capacities from 50 to 300 second-feet; 101 miles with capacities less than 50 second-feet.
Tunnels: Number, 1; total length, 3,297 feet.
Storage dams: Volume—earth, 23,100 cubic yards; rock fill, 33,500 cubic yards.
Diversion dams: Volume—masonry, 630 cubic yards; earth, 4,550 cubic yards.
Dikes or levees for protection from overflow: Total length, 5,097 feet; volume, 39,240 cubic yards.
Canal structures: 9 costing more than $2,000 each; 7 costing from $500 to $2,000 each; 500 costing less than $500 each.
Bridges: Wood, 9 with lengths of 50 feet or more and 77 with lengths less than 50 feet; total length, 2,586 feet.
Buildings: Offices, 1; residences, 5; barns and storehouses, 11.
Telephone lines: 75 miles; telephones in use, 51.
Material excavated: Class 1, earth, 1,522,706 cubic yards; class 2, indurated material, 291,253 cubic yards; class 3, rock, 104,724 cubic yards.
Riprap: 7,894 cubic yards.
Paving: 1,728 square yards.
Cement used: 13,912 barrels.
Concrete placed: 12,172 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 30,541 acres.
Area irrigated, season of 1911: 27,693 acres.
Length of irrigating season: From May 1 to September 30—153 days.
Character of soil of irrigable area: Decomposed basalt and rich alluvial deposits.
Principal products: Alfalfa, hay, grain, and vegetables.
Principal markets: Portland, Oreg.; Sacramento and San Francisco, Cal.

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LANDS OPENED FOR IRRIGATION

Dates of public notices: November 18 and December 7, 1908; August 24, 1909; June 9, 1910.

Location of lands opened: Tps. 38 S., R. 9 E., 39 S., Rs. 8 to 10 E.; 40 S., Rs. 9 to 11 E.; 41 S., Rs. 10 to 12 E., Willamette meridian; and 48 N., R. 5 E., Mount Diablo meridian.

Present status of irrigable lands opened: 44 acres entered subject to the reclamation act, 23 acres open to entry, 30,841 acres in private ownership.

Limit of area of farm units: 160 acres.

Duty of water: 1.8 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable area: $30.

Annual operation and maintenance charge: $0.75 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance made in October, 1903.
Preliminary surveys begun in 1904.
Board report May 1, 1905.
Construction authorized by secretary May 15, 1905.
Canal system of Klamath Falls Irrigating Co. purchased July 28, 1906.
Adams Canal purchased October 15, 1906.
East Branch Canal completed to Olene July, 1907.
Main Canal completed August, 1907.
First irrigation by Reclamation Service, season of 1907.
Keno Canal completed October, 1908.
South Branch Canal completed March, 1909.
Clear Lake Dam completed January, 1910.
Entire project 65 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Klamath project provides for the diversion of water from the east side of Link River at the lower end of Upper Klamath Lake through the Main Canal for the irrigation of 37,000 acres of land in Klamath and Poe Valleys, and 35,000 acres of land in the bed of Tule Lake. The bed of Tule Lake is to be reclaimed by diverting the inflowing waters of Lost River, through a canal about 8 miles in length, into Klamath River, after which it is expected that by evaporation and drainage through outlets opened at the south end of the lake the waters of the lake will rapidly recede and the lands will become available for cultivation. In order to regulate the flow of Lost River so that it can be successfully diverted at all times, flood water is to be stored in Clear Lake Reservoir. This stored water may be utilized later to irrigate lands in Modoc County, Cal., by constructing a diversion canal from the southwest extremity of the lake.

Water is also diverted on the west side of Link River through a short canal for power purposes for the irrigation and drainage of lands in the Lower Klamath marshes or at other points, as may be found desirable. The storage of water in Horse Fly Reservoir to irrigate lands in Langell and Yonna Valleys and the construction of the necessary supply and distribution works for that purpose may be undertaken in the future as a sub-project.

The principal features of the above irrigation plan which have been completed are: The Main Canal and head works, the South Branch Canal, the East Branch Canal, the lateral system in Klamath Valley, the Clear Lake Dam, and the Keno Power Canal.

Construction work is in progress upon the Lost River Dam and Diversion Channel and the drainage system.

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The features remaining for future construction are: The North and South Poe, Nuss and Griffith laterals, Tule Lake drainage and development, the Modoc sub-project, and the Langell and Yonna sub-project.

CONSTRUCTION DURING FISCAL YEAR.

Drainage system.—About 2 miles of drainage canals in the vicinity of Klamath Falls have been excavated the past year by force account with the aid of a drag-line excavator, and several miles more of drains will be deepened in the first unit during this season.

Lost River diversion.—In order to drain Tule Lake it is necessary to divert the flow of Lost River, its most important feeder, into the Klamath River by a canal about 8 miles in length, starting at a point on Lost River about 3 miles below Olene and 7 miles southeast of Klamath Falls. The canal will have a capacity of 250 second-feet, a bottom width of 52 feet, a depth of 4.3 feet, and will involve the excavation of 350,000 cubic yards of material. The diversion works in Lost River will consist of a hollow reenforced-concrete dam, 40 feet in height and 280 feet long, protected by earth fills at each end, aggregating 400 feet in length. This dam will raise the water level in Lost River about 24 feet and thus make possible, diversion by gravity into Klamath River. This work is all being done by contract. Excavation of the diversion channel was begun in March, and work on the dam was begun in April. On June 30, 1911, the entire work was 20 per cent completed.

OPERATION AND MAINTENANCE

During the season of 1910 the Main, East Branch, South Branch, and Adams Canals, with distributing systems, all aggregating 132 miles of canals, were operated, and 354 farms, aggregating 26,384 acres of land, were irrigated. About 41,000 acre-feet of water was diverted from Link River and 23,600 acre-feet was delivered to the farms. The operation of the system was practically continuous from May 1 to September 30, and there were no serious delays in the distribution of water. In addition to the above irrigation system there were also operated the Keno Canal for delivering water under contract for furnishing power, and the Clear Lake Dam which was utilized in regulating the flow of water to Tule Lake.

During the season of 1911 practically the same system is in operation and a slightly larger area is under irrigation. In May, 275,000 acre-feet of water was stored in Clear Lake Reservoir.

SETTLEMENT AND IRRIGATION

Settlement has been steadily going on. Many of the larger farms and ranches have been divided into smaller holdings, which have been sold to new settlers, and the average size of the farms has been reduced from 104 acres in 1907 to 69 acres in 1910. About 150 additional families settled on the farms during the year 1910. Since the inception of the project the principal city, Klamath Falls, has grown in six years from 500 to 4,000. This city will soon be located on the Southern Pacific through line from San Francisco to Portland. Final location of the Modoc Northern Railway has been made through

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the entire length of the first unit and it is expected that construction will be entered upon at an early date.

The climatic conditions and soil of the project seem to be well suited to the growing of alfalfa, grain, fruits, general farm products, to dairying, and to the raising of live stock. Alfalfa has been largely grown. It is usually irrigated three times and cut two or three times. The estimated value of crops in 1910 was $320,000, and the value of live stock was estimated at $356,000. The irrigated acreage has increased from 8,900 acres in 1907 to 27,700 acres in 1911, the larger part of which was devoted to pasture, alfalfa, barley, grain, hay, and oats in the order named. Crop conditions are excellent for the season of 1911 and all indications point to large yields. The demonstration farm of 80 acres has been largely seeded to grain and alfalfa.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation during the fiscal year ending June 30, 1911:

Principal contracts, Klamath project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1910	Completion due
347	1911 Jan. 5	W. H. Mason	Lost River diversion channel.	$63,607.00	$10,264.94	Mar. 16, 1912
351	Jan. 28	Geo. C. Clark	Lost River diversion works.	98,556.50	15,849.61	Dec. 31, 1911

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Klamath project

ASSETS

Accounts receivable:			
Uncollected water rentals		$166.50	
Uncollected miscellaneous		59.32	
Uncollected water-right building charges		87,300.20	
Uncollected water-right operation and maintenance charges		2,087.00	
Collections by General Land Office		1,712.00	
			$91,325.02
Inventories:			
Government animals		3,380.00	
Equipment in use	$26,102.95		
Less depreciation	1,274.35		
		24,828.60	
Storehouse		4,980.79	
Cement		3,479.89	
Lumber		2,149.21	
Explosives		856.16	
Forage		939.48	
Fuel		40.23	
Freight and handling undistributed		324.41	
			40,978.77

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Cost of work:			
Building cost	$1,970,560.35		
Plus adjustments	1,300.62		
		$1,971,860.97	
Less adjustments	994.75		
Less accrued revenues	34,529.11		
		35,523.86	
			$1,936,337.11
Operation and maintenance cost		87,434.95	
Less accrued revenues		1,360.25	
			86,074.70
Total assets			2,154,715.60

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$2,014,336.06		
Transfer vouchers received	50,470.84		
		2,064,806.90	
Collection vouchers	232,553.66		
Transfer vouchers issued	19,777.17		
		252,330.83	
			1,812,476.07
Accounts payable:			
Unpaid labor		2,728.47	
Unpaid purchases		3,984.49	
Unpaid contract estimates		15,540.80	
Unpaid contract holdbacks		2,714.21	
Unpaid freight and express		7,003.61	
Unpaid passenger fares		53.20	
Unpaid land agreements		19,841.25	
Unpaid miscellaneous		5.00	
			51,871.03
Repayments accrued:			
Building		229,368.60	
Operation and maintenance		60,999.90	
			290,368.50
Total liabilities			2,154,715.60

Feature costs to June 30, 1911, Klamath project

Canal system:		
Main Canal	$567,616.17	
East Branch Canal	43,733.49	
Keno Canal	98,984.39	
South Branch Canal	188,449.15	
South Branch laterals	57,065.19	
Poe Valley Canal	4,077.44	
Poe Valley laterals	589.20	
West Side Canal (upper project)	4,257.11	
East Side Canal (upper project)	5,577.12	
Carr extension of Adams Canal and flume	14,050.62	
		$984,399.88
Storage works:		
Clear Lake Dam	114,604.33	
Clear Lake Dikes	12,803.23	
Horsefly Reservoir	670.49	
Protection of dam and dikes	2,023.41	
		130,101.46
Diversion works:		
Lost River	26,847.79	
Channel	18,714.88	
Tule Lake outlet	10,765.55	
		56,328.22

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Buildings:		
Headquarters	$11,073.00	
Gatekeepers' and employees' cottages	5,334.21	
		$16,407.21
Drainage:		
Langell Valley drain (upper project)	428.16	
Lower project	24,985.67	
Lower lake and pumping plant	10,544.12	
		35,957.95
Telephone system: Construction		17,181.60
Real estate (rights and property): Canals, rights of way, and lands purchased		615,019.64
Examination of project as a whole:		
Preliminary expense	47,356.44	
Hydrography	17,989.46	
Reconnaissance and soil map (Modoc unit)	5,355.24	
		70,701.14
Experiment farm: Buildings, etc		14,992.99
Administration of project as a whole: General expense		24,081.93
Plant accounts:		
Rock-crushing plant	3,859.72	
Keno power plant	788.51	
South Branch power plant	740.10	
		5,388.33
Total building cost		1,970,560.35
Operation and maintenance:		
General expense	26,988.74	
Property	541.41	
Earthwork	23,528.30	
Structures	13,025.22	
Distribution	10,071.40	
Telephone	2,171.57	
Canal—maintenance	5,889.08	
Canal—operation	1,570.55	
Cement pipe, construction	186.61	
Gates and fences	505.23	
Worden farm	1,949.64	
Keno Canal, operation and repairs	1,007.20	
Total operation and maintenance cost		87,434.95
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		2,057,995.30

SOUTH DAKOTA, BELLE FOURCHE PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Butte and Meade.

Townships: 6 to 10 N., Rs. 3 to 8 E., Black Hills meridian.

Railroads: Chicago & Northwestern; Chicago, Burlington & Quincy; Chicago, Milwaukee & St. Paul.

Railroad stations: Belle Fourche, Newell, Nisland, Fruitdale, Sturgis, and Whitewood, S. Dak.

Average elevation of irrigable area: 2,800 feet above sea level.

Average annual rainfall on irrigable area: 13 inches.

Range of temperature on irrigable area: —20° to 95°.

WATER SUPPLY

Source of water supply: Belle Fourche River.

Area of drainage basin: 4,265 square miles.

Annual run-off in acre-feet of Belle Fourche River at diversion dam (4,265 square miles), 1903 to 1910: Maximum, 433,000; minimum, 155,000; mean, 304,000.

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DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoir: Belle Fourche—area, 8,010 acres; total capacity, 209,770 acre-feet; available capacity, 203,770 acre-feet; length of spillway, 314 feet; elevation of spillway, 100 feet above stream bed.

Storage dam: Belle Fourche—type, earth fill; maximum height, 115 feet; length of crest, 6,200 feet; volume, 1,600,000 cubic yards.

Diversion dam: Type, concrete weir; maximum height, 23 feet; length of masonry crest, 400 feet; length of earth fill, 900 feet; volume—concrete, 12,150 cubic yards; earth, 6,040 cubic yards.

Length of canals: 6½ miles with capacities greater than 800 second-feet; 55 miles with capacities from 301 to 800 second-feet; 105 miles with capacities from 300 to 50 second-feet; 460 miles with capacities less than 50 second-feet.

Tunnel: 1; length, 1,306 feet.

Irrigable area: About 100,000 acres.

Present status of irrigable lands (entire project): 22,845 acres entered subject to the reclamation act; 1,655 acres open to entry; 20,000 acres withdrawn from entry; 5,500 acres of State lands; about 50,000 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 6½ miles with capacities of more than 800 second-feet; 19 miles with capacities from 301 to 800 second-feet; 65 miles with capacities from 50 to 300 second-feet; 205 miles with capacities less than 50 second-feet.

Tunnel: 1; total length, 1,306 feet.

Storage dam: 1; volume, earth, 1,546,000 cubic yards.

Diversion dam: 1; volume, masonry, 12,149 cubic yards.

Canal structures: 17 costing more than $2,000 each; 89 costing from $500 to $2,000 each; 824 costing less than $500 each.

Bridges: Steel, 5 with a total length of 360 feet; wood, 155 with lengths of less than 50 feet each, total length 2,192 feet; concrete, 2, total length 28 feet.

Buildings: Offices, 3; residences, 6; barns and storehouses, 8.

Telephone lines: 57 miles. Telephones in use, 23.

Material excavated: Class 1, earth, 5,117,710 cubic yards; class 2, indurated material, 97,424 cubic yards; class 3, rock, 41,815 cubic yards.

Riprap: 30 cubic yards.

Paving: 67,460 square yards.

Cement used: 62,204 barrels.

Concrete placed: 47,684 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 47,542 acres.

Area irrigated, season of 1911: 33,362 acres.

Length of irrigating season: From May 1 to Oct. 10—163 days.

Character of soil of irrigable area: North side, clay loam; south side, sandy loam.

Principal products: Grain, alfalfa, potatoes, sugar beets, garden truck, small fruit.

Principal markets: Omaha, Nebr.; Chicago, Ill.; Minneapolis and St. Paul, Minn.; and mining towns in the Black Hills.

LANDS OPENED FOR IRRIGATION

Dates of public notices, regulation, and orders relating thereto: June 21, 1907; May 29, 1908; January 18, 1909; February 19 and November 26, 1910; January 24, March 9, and May 4, 1911.

Location of lands opened: T. 7 N., Rs. 5 and 6 E.; T. 8 N., Rs. 3 to 7 E.; T. 9 N., Rs. 2 to 5 E.; T. 10 N., Rs. 3 and 4 E., Black Hills meridian.

Present status of irrigable lands opened: 12,907 acres entered subject to the reclamation act; 1,655 acres open to entry; 2,706 acres of State lands; 30,274 acres in private ownership.

Limit of area of farm units: Public, 80 acres; private, 160 acres.

Duty of water: 2 acre-feet per acre per annum at the farm.

Building charge per acre of irrigable land: $30 and $40.

Annual operation and maintenance charge: $0.60 per acre of irrigable land.

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CHRONOLOGICAL SUMMARY

Reconnaissance and preliminary surveys began in 1903.
Construction authorized by Secretary May 10, 1904.
Diversion Dam and Inlet Canal completed September, 1907.
South Canal and lateral system completed April, 1910.
Belle Fourche Dam completed June, 1911.
First irrigation, season of 1908.
Entire project 90 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Belle Fourche project provides for the diversion of water from Belle Fourche River, by means of a dam about 2 miles below Belle Fourche, S. Dak., and a short inlet or supply canal into a storage reservoir controlled by the Belle Fourche Dam on Owl Creek, a small tributary of Belle Fourche River; the distribution of water from the Inlet Canal to a small area of land; and the distribution of water from the reservoir through two canal systems to lands on both sides of the Belle Fourche River.

The features of the above irrigation plan completed are: The Diversion Dam and headworks, Inlet Canal, Belle Fourche Dam, South Canal, first division of North Canal, laterals under South Canal, and laterals under first division of the North Canal.

Construction is in progress upon the second division of the North Canal, consisting of 22 miles of main canal, and upon all structures on this division of the canal and the connecting lateral system.

The features remaining for future construction are: The last 18 miles of the North Canal and approximately 150 miles of laterals, including Willow Creek and Nine Mile Laterals and their branches.

CONSTRUCTION DURING FISCAL YEAR

Belle Fourche Dam.—Contract work on the Belle Fourche Dam has advanced from 81 per cent to completion during the fiscal year. About 90 per cent of the work done during this period was in connection with the concrete revetment on the reservoir slope. The original time for completion of the contract expired on December 1, 1910, but an extension to July 1, 1911, was granted by the Secretary of the Interior. During the winter a drainage system, 2,550 feet long, was installed at the toe of the dam by force account. The main part of this system is a gravel-filled trench, 3 feet wide by 12 feet deep, in which is placed a line of 12-inch vitrified pipe with open joints, 12 inches from the bottom. A concrete chamber containing a cast-iron weir notch is provided for measuring the amount of the seepage. Three 58-inch balanced valves were installed at the intakes of the regulating conduit. Two of these valves were placed at the north conduit and one at the south conduit. The valves are inclosed in heavily reenforced concrete pits provided with suitable grillage. At the north pit the valves open into two lines of cast-iron pipe 5 feet in diameter, which join about 28 feet from the pit, forming a cast-iron conduit 8 feet wide by 7 feet high. This cast-iron conduit has a cross section identical with the concrete regulating conduit, which it joins at a distance of 72 feet from the valves.

North Canal.—The second division of the North Canal is being excavated by contract, and the structures are being built by force

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account. This work was undertaken in the spring of 1911, and excellent progress has been made, the entire work being about half completed on June 30. This division extends from Indian Creek to Dry Creek, a distance of about 22 miles, and will cover about 25,000 acres of land located between Indian Creek and Dry Creek, including the land under what is known as the Townsite Lateral, supplying the town of Newell and lands adjacent thereto. The canal section is 30 feet wide on the bottom and with a water depth of 6 feet.

Lateral system.—The excavation of the Townsite Lateral, and other laterals under the second division of the North Canal is being done by small informal contracts, so that the settlers can have a chance to secure the work. The structures are being built by force account, mainly by the settlers who do not care to bid on contract work. It is expected this work will be completed during the season.

OPERATION AND MAINTENANCE

During the season of 1910 the diverting works, Inlet Canal, storage works, a small section of the North Canal, the entire South Canal, and the lateral systems connected therewith, including 60 miles of main canals and 230 miles of main laterals, were operated from May 1 to October 1, and 312 farms, aggregating 15,410 acres of land, were irrigated. The second unit of the project, including all lands south of the Belle Fourche River and that north of the river between Owl Creek and Horse and Indian Creeks, was opened for irrigation by public notice of February 19, 1910. Approximately 66,000 acre-feet of water was diverted from the Belle Fourche River and 30,000 acre-feet were actually used for irrigation. In May the reservoir was sufficiently completed to be utilized for storage, and in August 12,000 acre-feet of water were stored.

During the season of 1911 the lands of the first and second units are being irrigated as in 1910. On June 30, 33,339 acres were covered by water-right application and 19,000 acres were being irrigated. Water was turned into the reservoir on March 15, and with the exception of two days the entire flow of the Belle Fourche River was diverted through the inlet canal. On June 30, 1911, 30,150 acre-feet had been diverted, of which 24,400 acre-feet had been delivered to the farms.

SETTLEMENT AND IRRIGATION

In the area open to settlement there are 208 public land farm units, and on June 30, 1911, 182 of these had been entered and 26 were still open to entry. Sixteen units had been entered between June 30, 1910, and June 30, 1911. Water-right applications have been received for 256 farms in private ownership, embracing about 70 per cent of the private lands for which water could be supplied and which are subject to assessment.

The three towns of Nisland, Fruitdale, and Newell, on the line of the Belle Fourche Valley & Northwestern Railroad are growing, and the population on the farms is more than 1,700. The season of 1910 was very dry, and the greater portion of the land had to be irrigated before the grain would sprout. The principal crops were wheat, oats, corn, alfalfa, and native hay, and the average value of crops

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was $11.09 per acre. In 1911 the same conditions prevailed, and practically all fields had to be irrigated before the grain would sprout. The exceptions to this were fields which were fall irrigated the previous season or new land which was plowed the summer before and not put into crop during that year.

PUBLIC NOTICE DATED NOVEMBER 26, 1910

In pursuance of the terms of the public notices heretofore issued for the Belle Fourche project, South Dakota, under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), it is hereby announced that the portion of the installment on account of operation and maintenance to become due December 1, 1911, and annually thereafter on the same date of each year, until further notice, shall be 60 cents per acre of irrigable land, and the portion of the installment for operation and maintenance to accompany entries hereafter made until further notice shall likewise be 60 cents per acre of irrigable land.

In accordance with regulations heretofore established no water will be furnished for the irrigation season of 1911 for any lands until the portion of the installment for operation and maintenance therefor, due on December 1, 1911, has been paid; and in like manner for subsequent years no water will be furnished to any lands until payment of said portion of the installment is made for the current and prior years.

ORDER DATED JANUARY 24, 1911

The public notices heretofore issued in pursuance of the reclamation act of June 17, 1902 (32 Stat., 388), announcing the charges for lands opened to irrigation under the Belle Fourche project, South Dakota, are hereby suspended as to the charges, times and manner of payment, for lands as follows: Lands hereafter entered; lands in private ownership, not now held under trust deed; and lands not now signed under contract with the Belle Fourche Valley Water Users' Association.

Applications for water rights for such lands may be made and received subject to such charges, time, and manner of payment as may be fixed by public notices hereafter issued.

ORDER DATED MARCH 9, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Pub. No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section 4 of the reclamation act, and for other purposes," the following order is promulgated for the purpose of relieving the present situation on the Belle Fourche project, pending the issue of public notice modifying or abrogating the notices heretofore issued.

2. A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment will become effective as to all water-right applications subject to public notices heretofore issued upon the payment of $1.50 per acre on or before March 31, 1911, subject, however, to future compliance with the conditions of a public notice to be hereafter issued making an increased building charge which shall be between $35 and $38 per acre. Such stay of proceedings shall remain in effect until further announcement by means of a public notice or otherwise. No water will be furnished in any case unless the holdings of the applicant shall have been conformed to the farm unit shown on the approved farm-unit plats.

3. Upon failure to make payment as herein required on or before March 31, 1911, the entry or water-right application or both, as the case may be, which would otherwise be subject to cancellation, will be promptly canceled without further notice.

4. All applications for water rights filed under the provisions of the notices heretofore issued and for which the payment necessary to avoid cancellation shall have been made on or before March 31, 1911, shall be continued in effect at the same building charge as fixed in such prior notices.

ORDER DATED MAY 4, 1911

1. The order issued January 24, 1911, under the provisions of the reclamation act, for the Belle Fourche project, South Dakota, suspends the provisions of prior notices as to the charges, time and manner of payment on water-right applications for lands thereafter entered, lands in private ownership not held under trust deed, and lands not signed under contract with the Belle Fourche Valley Water Users' Association. It was announced that applications for water rights for such lands might be received,

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subject to such charges, time and manner of payment as may be fixed by public notice thereafter issued.

2. Pending the issuance of such notice it is hereby ordered that all entries made on and after January 24, 1911, whether for lands not theretofore entered, or for land covered by prior entries which have been canceled by relinquishment or otherwise, shall be accompanied by applications for water right in due form and by the first installment of the charges for building, operation, and maintenance as theretofore required, not less than $3.60 per acre of irrigable land, subject, however, to such additional payments and such increased charges for building, operation, and maintenance as may be prescribed by public notice to be hereafter issued.

3. Water-right applications may also be made for lands in private ownership not deeded in trust to the Belle Fourche Valley Water Users' Association, and lands not signed under contract with the said association, subject to the terms of public notices heretofore issued except the amount of the building charge; but all such water-right applications filed on or after January 24, 1911, shall be subject to the terms of public notice to be hereafter issued, which will prescribe an increased building charge.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Belle Fourche project

No.	Date	Contractor	Description	Estimated value	Estimated earnings, June 30, 1911	Completion due
234	Apr. 8, 1909	National Surety Co...	Dam and canals.....	$693,187.34	$720,620.62	July 1, 1911
334	Aug. 6, 1910	Pittsburgh Valve, Foundry & Construction Co.....	Balanced valves.....	11,670.00	11,670.00	Mar. 3, 1911
340	Oct. 21, 1910	Marshall Foundry Co.	Cast-iron pipe.....	7,697.25	[1] 7,816.47	Feb. 13, 1911
360	Mar. 29, 1911	Cornelius Cole.....	Earthwork, North Canal.	37,130.00	13,476.00	Feb. 1, 1912
361	Apr. 1, 1911	J. W. McNeal.....	.....do.....	19,970.00	9,762.00	Do.
364	Mar. 28, 1911	Seitz & Shevling.....	.....do.....	16,740.00	14,119.00	Feb. 11, 1912
366	Apr. 18, 1911	Maney Bros. & Co.....	.....do.....	76,400.00	37,203.36	Feb. 16, 1912
396	June 6, 1911	Dotson & Shirley.....	Division C, Townsite Lateral.	7,161.00	2,415.72	Sept. 30, 1911

[1] Completed

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Belle Fourche project

ASSETS

Accounts receivable:		
Uncollected miscellaneous	$2,780.74	
Uncollected water-right building charges	92,630.67	
Uncollected water-right operation and maintenance charges	801.77	
		$96,213.18
Inventories:		
Mercantile store	106.38	
Government animals	10,623.42	
Equipment in use	22,395.61	
Storehouse	8,876.29	
Cement	6,514.45	
Lumber	11,552.00	
Forage	2,933.21	
Fuel	276.83	
Cash in office safe	29.53	
Local products	390.86	
Unadjusted transfers	861.18	
		64,559.76

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Cost of work:			
Building cost	$2,808,714.75		
Plus adjustments	3,258.94		
		$2,811,973.69	
Less adjustments	14,864.97		
Less accrued revenues	11,866.01		
		26,730.98	
			$2,785,242.71
Operation and maintenance cost		77,414.12	
Less accrued revenues		182.69	
			77,231.43
Total assets			3,023,247.08
LIABILITIES			
Investment of the United States:			
Disbursement vouchers	$2,751,822.55		
Transfer vouchers received	68,564.64		
		2,820,387.19	
Collection vouchers	120,053.19		
Transfer vouchers issued	16,988.96		
		137,042.15	
			2,683,345.04
Accounts payable:			
Unpaid labor		8,099.20	
Unpaid purchases		25,477.07	
Unpaid contract estimates		43,460.91	
Unpaid contract holdbacks		55,031.61	
Unpaid freight and express		12,311.66	
Unpaid passenger fares		90.32	
			144,470.77
Repayments accrued:			
Building		154,854.12	
Operation and maintenance		40,577.15	
			195,431.27
Total liabilities			3,023,247.08

Feature costs to June 30, 1911, Belle Fourche project

Diversion dam and structures: Completed cost			$117,322.76
Supply canal and structures:			
Earthwork		$242,923.86	
Crow Creek sluice		60,581.98	
Drop at reservoir		4,852.62	
Bridges, highway		10,233.05	
Culverts, concrete		2,777.04	
Gates, check		5,207.87	
Bridge abutments		1,636.21	
Flood expense		2,969.37	
			331,182.00
Storage works:			
Dam and appurtenances, Belle Fourche—			
Orman & Crook contract		273,367.40	
National Surety Co		848,756.48	
Reservoir, Belle Fourche, clearing site		1,837.84	
			1,123,961.72
North canal:			
Division A—			
Orman & Crook contract	109,843.05		
National Surety Co. (preliminary)	254.60		
Minor structures, bridge No. 1	274.25		
		110,371.90	
Division B—			
Excavation, schedules 1 to 5, inc	52,965.00		
Structures	20,643.38		
		73,608.38	

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North canal—Continued.			
Division C—			
Survey and design	$1,401.98		
Excavation, schedules 6 to 8, inc	33,157.48		
Structures	11,961.33		
		$46,520.79	
			$230,501.07
South canal:			
Division A—			
Orman & Crook contract	77,847.04		
Feeder Canal to South Canal	2,863.72		
		80,710.76	
Division B—			
Earthwork, class A	37,209.04		
Earthwork, class B	6,214.70		
Earthwork, sections 2A and 2B	22,303.78		
Belle Fourche Siphon	58,905.15		
Stinkingwater culvert No. 2	7,562.59		
Belle Fourche River Tunnel	33,230.29		
Anderson Draw Siphon	13,095.98		
Reenforced concrete canal lining	12,926.17		
Tunnel portals	21,372.39		
Earthwork, class C, section 2	4,417.51		
Stinkingwater Flume	3,068.20		
South Canal sluice gates	766.29		
		221,072.09	
Division C—			
Excavation for structures	7,033.72		
Grading for structures	6,305.03		
Concreting structures	27,599.39		
Timbering structures	5,119.73		
Excavation, sections 4 to 8, inc	121,232.41		
Whitewood Siphon	16,346.67		
Flood expense, Whitewood Creek	612.85		
Vitrified pipe structures,	110.09		
		184,359.89	
Nine Mile Creek extension		1,115.39	
			487,258.04
Lateral system, division A:			
Excavations and concrete work		144,718.48	
Structures		101,887.26	
			246,605.74
Lateral system, division B:			
Surveying and designing		3,842.95	
Excavation		6,345.08	
Structures		4,820.85	
			15,008.88
Lateral system, division C:			
Excavation		51,067.82	
Structures		13,205.12	
			64,272.94
Telephone system: Construction			11,422.85
Real estate (rights and property):			
Lands purchased (not submerged)		32,545.06	
Lands purchased and submerged by reservoir		19,724.77	
			52,269.83
Irrigible lands: Farm unit subdivision			18,276.31
Buildings:			
At diversion dam		4,327.53	
At reservoir		11,590.72	
At tunnel		216.03	
At siphon		313,07	
At Vale		1,726.71	
At Newell		2,854.24	
Portable houses		1,385.25	
Cottage, inspector's, at gravel pit		144.42	

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Buildings—Continued.		
Tents, Indian Creek camp	$578.15	
Tents, Horse Creek camp	614.00	
Tents, lateral	52.97	
Warehouse, Belle Fourche	1,483.34	
Plant and tents at Whitewood Siphon	235.76	
		$25,522.19
Demonstration farm: Buildings		4,023.45
Reconnaissance: Examination		1,009.64
Examination:		
Cheyenne River	336.89	
Little Missouri River	1,247.41	
		1,584.30
Extraordinary expense: Flood		1,811.19
Ninemile Creek extension:		
Lateral excavation	20,625.33	
Structures, 12, 18, and 24 inch pipe	421.45	
Structures, concrete	443.62	
Structures, timber	229.16	
Structural excavation	75.83	
Structural backfilling	33.08	
Structural grading	106.68	
Excavation, sublateral	244.28	
Culverts, 5-foot steel	1,150.25	
		23,329.68
Betterments: Installation of 8 needle valves		51,650.90
Inventory of cost ledger supplies		1,701.26
Total building cost		2,808,714.75
Operation and maintenance:		
Main Canal, Orman unit	10,881.18	
South Canal, Orman unit	5,066.27	
North Canal, Orman unit	3,128.54	
Laterals, Orman unit	23,507.68	
South Canal, Vale unit	9,074.51	
Laterals C, Vale unit	5,787.15	
Laterals A, Vale unit	4,117.57	
Dam, Belle Fourche	911.19	
Ditches, drainage and seepage	474.05	
Toe of dam, drainage and seepage	14,465.98	
		77,414.12
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		2,886,128.87

UTAH, STRAWBERRY VALLEY PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Utah and Wasatch.
Townships: 8 and 9 S., Rs. 1 to 3 E., Salt Lake meridian.
Railroads: Denver & Rio Grande; San Pedro, Los Angeles & Salt Lake.
Railroad stations: Spanish Fork, Payson, Springville, and Salem, Utah.
Average elevation of irrigable area: 4,600 feet above sea level.
Average annual rainfall on irrigable area: 18 inches.
Range of temperature on irrigable area: −10° to 95°.

WATER SUPPLY

Source of water supply: Strawberry and Spanish Fork Rivers.

Area of drainage basins: Strawberry River, 175 square miles; Spanish Fork River 670 square miles.

Annual run-off in acre-feet: Strawberry River in Strawberry Valley, 1903 to 1906, 1909, and 1910—maximum, 150,000; minimum, 49,000; mean, 77,500. Spanish Fork River at Spanish Fork (670 square miles), 1903 to 1910—maximum, 227,000; minimum, 65,800; mean, 125,000.

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DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features]

Reservoir: Strawberry—Area, 8,200 acres: capacity, 278,000 acre-feet; length of spillway at tunnel, 58 feet; elevation of spillway, 58 feet above stream bed; length of spillway at dam, 20 feet; elevation above stream bed, 59 feet.
Storage dam: Strawberry—Type, earth fill with concrete core wall; maximum height, 71 feet; length of crest, 450 feet; volume, 100,000 cubic yards.
Diversion dam: Spanish Fork—Type, reenforced concrete weir; maximum height, 16 feet; length of masonry, 70 feet; length of earth fill, 25 feet; volume, 100 cubic yards.
Length of canals: 5½ miles with capacities greater than 300 second-feet; 40 miles with capacities from 300 to 50 second-feet; 100 miles with capacities less than 50 second-feet.
Tunnels: Aggregate length, 22,130 feet.
Dikes: Aggregate length, 1,800 feet.
Water power: 1,200 horsepower developed; estimated total, 3,500 horsepower.
Irrigable area: 60,000 acres.
Present status of irrigable land: All in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 3½ miles with capacities from 301 to 800 second-feet.
Tunnels: 3 with a total length of 13,493 feet.
Diversion dams: Volume—Masonry, 1,261 cubic yards.
Dikes or levees for protection from overflow: Total length, 500 feet; volume, 1,350 cubic yards.
Canal structures: 6 costing over $2,000 each, 2 costing from $500 to $2,000 each.
Bridges: Wood—19 with lengths of less than 50 feet each, total length, 400 feet; concrete—1 with a length of 10 feet.
Buildings: Offices, 1; residences, 3; barns and storehouses, 1; power house, 1.
Roads: 39 miles.
Telephone lines: 31 miles. Telephones in use, 10.
Transmission lines, 29½ miles.
Material excavated: Class 1, earth, 330,757 cubic yards; class 2, indurated material, 38,874 cubic yards; class 3, rock, 76,292 cubic yards.
Riprap: 7,400 cubic yards.
Paving: 228 square yards.
Cement used: 19,865 barrels.
Concrete placed: 19,183 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: None.
Area irrigated, season of 1911: None.
Length of irrigating season: April 15 to September 30—168 days.
Character of soil of irrigable area: Sandy loam and gravel and black alluvium.
Principal products: Alfalfa, hay, cereals, sugar beets, fruits, and vegetables.
Principal markets: Salt Lake City, Utah, and adjacent towns and mining districts.

LANDS OPENED FOR IRRIGATION

(No lands have been opened for irrigation by public notice.)

CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys began in 1903.
Construction authorized by Secretary, December 15, 1905.
Power canal completed December, 1908.
Strawberry Tunnel 44 per cent completed June 30, 1911.
Entire project 47 per cent completed June 30, 1911.

IRRIGATION PLAN

The irrigation plan of the Strawberry Valley project provides for the storage of water in a reservoir on Strawberry River; the

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discharge of stored water through a tunnel about 3½ miles long into Diamond Fork, a tributary of Spanish Fork River; and the diversion of water from Spanish Fork River into canal systems watering lands on both sides of the river east of Utah Lake. A hydroelectric plant about 3 miles below the diversion dam of the first canal diverting on the south side of the river supplies power for construction and commercial purposes. Some of the power developed will also be used for pumping water for the irrigation of high lands and drainage of low lands.

The features of the above irrigation plan which have been completed are: The diversion dam, the power canal, and the first unit of the power plant. In connection with this work there has also been constructed a wagon road 39 miles long, a telephone line 31 miles long, and two power transmission lines aggregating 29½ miles in length. Construction is in progress upon Strawberry Tunnel and Strawberry Dam. Features remaining for future construction are Indian Creek Dike, Indian Creek and Trail Hollow Diversion Canal, Highline Canal, and the reconstruction and extension of the existing distribution system.

CONSTRUCTION DURING FISCAL YEAR

Strawberry Tunnel.—The Strawberry Tunnel, 19,100 feet long, is being excavated and lined with concrete, the work being carried on from the west portal with 3 shifts. A detail description of the tunnel and the construction work to June 30, 1910, can be found in the ninth annual report. On June 30, 1911, 11,993 feet of tunnel had been excavated and 6,896 feet lined with concrete. During the fiscal year, 3,990 feet were excavated. In the latter part of December, 1910, a flow of approximately 7 second-feet of water was encountered near Station 105. This flow of water has continued since that time and has greatly impeded progress. The material encountered has varied from hard, blue limestone to soft sandstone and shale. The last-named material carries considerable water and disintegrates rapidly on being exposed to the air, which makes it necessary to timber the tunnel carefully to protect the workmen.

A stone-crushing plant has been installed at the west portal to furnish sand and crushed rock for the concrete lining of the tunnel. The work of lining the tunnel with concrete was commenced in October, 1910, and by June 30, 1911, 6,896 feet of tunnel had been lined and completed. The heavy flow of water encountered has increased the difficulty and expense of placing the concrete. The material is handled by means of cars hauled by electric locomotives.

An additional ventilating blower was installed near Station 110 in the tunnel. This, with the blower installed at Station 40, completes the ventilating system for the west portal.

The work of extending the power transmission line from the substation at the west portal of the tunnel to the east portal and the Strawberry Dam, a distance of 10 miles, has been commenced. All the necessary material has been purchased and delivered, the holes dug and poles distributed.

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Construction work will be started on the east portal cut of the tunnel as soon as the equipment and material ordered can be delivered.

Strawberry Reservoir.—At the east entrance to the Strawberry Tunnel there is to be located a reservoir for impounding the water from Strawberry River and its tributaries and regulating its flow through the tunnel. This reservoir is to be formed by the construction of an earth dam with concrete core wall, 71 feet high and 490 feet long, across the upper end of the canyon of Strawberry River, and an earth dike 1,400 feet long, located in a saddle between the Indian Creek and Strawberry River basins. The available water supply is to be further increased by diverting water from two creeks into the reservoir by the Indian Creek and Trail Hollow Diversion Canal about 5 miles in length and having a capacity of 500 second-feet.

The Strawberry Dam is to be constructed of earth, with a concrete core wall, and rock paving on the upstream slope. A tunnel 500 feet long in which two gates will be installed will regulate the flow in the Strawberry River. The dam is being constructed by force account, and on June 30, 1911, the camp buildings had been erected, the site of the dam cleared and plowed, excavation for portal cuts to sluicing tunnel begun, tunnel excavation from one portal commenced and preparation of foundations for cableway towers, and crushing plant completed.

The Indian Creek Dike is to be constructed by contract, and award was made a few days before the close of the fiscal year.

Plans and specifications have been issued for the construction of the Indian Creek and Trail Hollow Diversion Canal and bids will be opened August 7, 1911.

Surveys.—Considerable preliminary work was done on the investigation of a number of reservoir sites along Diamond Fork Creek and measurements have been made to determine the elevation of underground water on the low ground in the vicinity of Utah Lake. From present indications it appears that a number of pumping plants will be found feasible and a considerable area irrigated by pumping.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Strawberry Valley project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1911	Completion due
330	June 17, 1910	J. W. G. Stebbins.....	Concrete block dwelling house.	$2,852.00	[1] $2,847.32	Oct. 30, 1910
350	Feb. 1, 1911	Jeffrey Manufacturing Co.	Two electric locomotives.	3,070.00	.....	Mar. 17, 1911

[1] Completed.

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Strawberry Valley project

ASSETS

Inventories:			
Mercantile store		$2,933.02	
Government animals		2,928.75	
Equipment in use	$26,734.95		
Less depreciation	1,678.50		
		25,056.45	
Storehouse		82,646.42	
Lumber		5,761.61	
Fuel		98.00	
Cash in office safe		290.10	
Freight and handling undistributed		3,578.18	
			$123,292.53
Cost of work:			
Building cost	1,213,792.97		
Plus adjustments	1,529.42		
		1,215,322.39	
Less adjustments	54,087.06		
Less accrued revenues	30,922.14		
		85,009.20	
			1,130,313.19
Total assets			1,253,605.72

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$1,240,312.93		
Transfer vouchers received	45,405.36		
		1,285,718.29	
Collection vouchers	64,670.53		
Transfer vouchers issued	6,635.86		
		71,306.39	
			1,214,411.90
Accounts payable:			
Unpaid labor		15,021.24	
Unpaid purchases		12,373.92	
Unpaid contract holdbacks		4,270.19	
Unpaid freight and express		7,246.32	
Unpaid passenger fares		86.70	
Unredeemed coupon books		195.45	
			39,193.82
Total liabilities			1,253,605.72

Feature costs to June 30, 1911, Strawberry Valley project

Storage works, reservoir (preliminary)			$6,685.17
Strawberry Tunnel:			
Driving Heading No. 2 (west portal)		$463,754.12	
Lining Heading No. 2		87,167.59	
Survey, reconnaissance, alignment, and levels		6,575.42	
Tramway and concrete plant heading No. 2, equipment and installation		42,845.68	
Survey, east portal cut		120.00	
East portal construction plant		139.30	
East portal controlling works		127.55	
			600,729.66
Tunnel plant:			
Power-house tunnel		2,447.91	
Electric power house, construction		4,845.55	
Hauling and storing machinery		14,158.95	
			21,452.41

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Power canal:		
Excavation, classes 1, 2, 3, and 4	$136,028.18	
Driving and lining Tunnels Nos. 1 and 2	49,458.45	
Lining canal, resloping, and clearing	48,668.62	
Structures (aqueduct, culvert, Station 139+03, waste-way and sand box, excavation, and concrete)	40,629.74	
Spanish Fork Reservoir	4,492.68	
Spanish Fork Diversion Dam	39,695.90	
Spanish Fork River improvement	5,882.81	
Bridges over wasteway	273.52	
Bridges over tailrace	143.01	
Bridge No. 2a	563.57	
Bridge No. 3b	548.57	
Power canal improvement	6,574.08	
Upper bridge over wasteway	458.72	
Side walls and footbridges	785.16	
River bridge, canal diversion dam	2,524.60	
Arch covering concrete	1,329.00	
Raising concrete lining	857.97	
		$338,914.58
Power plant, hydroelectric:		
Excavation (building proper), concrete foundation, construction of building, and machinery installation	47,184.56	
Penstock construction	8,241.13	
Transmission line, construction	25,588.62	
Spanish Fork power line, construction	4,204.35	
Power plant, improvements	2,472.88	
Operation and maintenance during construction	4,050.00	
		91,741.54
High-line Canal:		
Earth and rock work	13,421.69	
Head gates and diversion	481.19	
		13,902.88
Distribution system, preliminary investigation		661.19
Wagon roads (construction), Diamond Fork		38,251.69
Telephone system:		
Construction	13,643.04	
Maintenance	2,588.44	
		16,231.48
Real estate (rights and property), lands purchased		8,400.00
Buildings, construction of:		
Camp Quinton	34,772.49	
Diamond Switch camp	5,687.42	
Power house camp	10,609.48	
Diversion dam camp	6,131.44	
Sulphur Spring camp	637.07	
Strawberry Dam camp	1,351.51	
		59,189.41
Irrigable lands:		
Surveys, topography	4,490.10	
Water rights, investigation	4,097.03	
		8,587.13
Examination of project as a whole, hydrography		5,967.99
Inventory of cost ledger supplies		3,077.84
Total building cost as per debit in cost of work in statement of assets and liabilities		1,213,792.97

WASHINGTON, OKANOGAN PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Okanogan.
Townships: 33 and 34 N., Rs. 25 to 27 E., Willamette meridian.
Railroad: Great Northern.
Railroad station: Oroville, Wash., 50 miles from project.
Average elevation of irrigable area: 1,000 feet above sea level.
Average annual rainfall on irrigable area: 8 inches.
Range of temperature on irrigable area: −10° to 105°.

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WATER SUPPLY

Source of water supply: Salmon Creek.
Area of drainage basin: 152 square miles.
Annual run-off in acre-feet of Salmon Creek at Jones ranch near Malott (152 square miles), 1903 to 1910: Maximum, 56,500; minimum, 13,000; mean, 31,800.

DATA FOR COMPLETE PROJECT

Reservoirs: Salmon Lake—area, 200 acres; capacity, 2,000 acre-feet. Conconully—area, 640 acres; capacity, 13,000 acre-feet; length of spillway, 180 feet; elevation of spillway, 56 feet above stream bed.
Storage dam: Conconully—type, hydraulic earth fill; maximum height, 64 feet; length of crest, 1,000 feet; volume, 336,000 cubic yards.
Diversion dam: Salmon Creek—type, concrete weir; maximum height, 4 feet; length of masonry, 50 feet; length of earth fill, 80 feet; volume, 801 cubic yards.
Length of canals: None with capacities greater than 300 second-feet; 12 miles with capacities from 300 to 50 second-feet; 29 miles with capacities less than 50 second-feet.
Length of tunnel: 395 feet.
Irrigable area: Entire project, 10,051 acres; first unit, 2,052 acres; second unit, 6,085 acres; third unit, 410 acres; old water rights, 1,353 acres; town of Okanogan, 151 acres.
Present status of irrigable lands (entire project): 1,234 acres entered subject to the reclamation act, 8,817 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 12 miles with capacities from 50 to 300 second-feet; 29 miles with capacities less than 50 second-feet.
Tunnels: Number, 1; total length, 395 feet.
Storage dams: Volume, 336,000 cubic yards.
Diversion dams: Volume—masonry 131 cubic yards; earth, 630 cubic yards; rock fill, 40 cubic yards.
Canal structures: 1 costing more than $2,000; 2 costing from $500 to $2,000 each; 425 costing less than $500 each.
Bridges: Wood, 3 with lengths less than 50 feet each; total length, 100 feet.
Buildings: Offices, 1; residences, 4; barns and storehouses, 2.
Roads: 2 miles.
Telephone lines: 25 miles. Telephones in use, 9.
Material excavated: Class 1, earth, 630,000 cubic yards; class 2, indurated material, 95,000 cubic yards; class 3, rock, 50,000 cubic yards.
Riprap: 1,034 cubic yards.
Paving: 925 square yards.
Cement used: 2,470 barrels.
Concrete placed: 2,327 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 10,051 acres.
Area irrigated, season of 1911: 6,349 acres.
Length of irrigating season: May 1 to September 15—138 days.
Character of soil of irrigable area: Volcanic ash, sand, gravel.
Principal products: Fruits, hay, grain, and vegetables.
Principal markets: Local.

LANDS OPENED FOR IRRIGATION

Dates of public notices and orders: November 12, 1908; March 12, 1910; April 8, 1910; February 23, 1911; March 28, 1911.
Location of lands opened: Ts. 33 and 34 N., Rs. 25 to 27 E., Willamette meridian.
Present status of irrigable lands opened: 1,234 acres entered subject to the reclamation act; 8,817 acres in private ownership.
Limit of area of farm units: Public, 40 acres; private, 40 acres.
Duty of water: 2½ acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $65.
Annual operation and maintenance charge: $2 per acre of irrigable land.

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CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys begun in 1903.
Construction authorized by Secretary, December 2, 1905.
Salmon Lake inlet and outlet completed, July, 1908.
First irrigation by Reclamation Service, season of 1908.
Conconully Dam completed, August, 1910.
Entire project completed, October, 1910.

IRRIGATION PLAN

The irrigation plan of the Okanogan project provides for the storage of water in Salmon Lake and in Conconully Reservoir controlled by Conconully Dam on Salmon Creek about 2 miles below Conconully, Wash.; the control of Salmon Lake Reservoir by a short inlet canal from Salmon River and concrete outlet works; the control of Conconully Reservoir by means of an outlet tunnel discharging into Salmon Creek below the storage dam; and the diversion of water from Salmon Creek by a dam about 12 miles below the reservoir into a canal system watering lands in the valley of Okanogan River between Riverside and Okanogan, Wash.

All of the features of the project—consisting of the inlet canal and outlet works to Salmon Lake; Conconully hydraulic filled dam, spillway, and outlet works; the diversion weir and distribution system—are completed and have been in use during the irrigation seasons of 1910 and 1911.

CONSTRUCTION DURING FISCAL YEAR

Salmon Lake.—During the winter of 1909–10 examinations, surveys, and estimates were made for the construction of an earth dam at the lower end of Salmon Lake which would increase its capacity from 2,000 to 9,000 acre-feet and provide for a hold-over supply of water from years of large run-off to dry years. The estimates, however, indicated that the cost of such a structure would approximate $150,000, which was considered prohibitive under present conditions.

Conconully Dam.—The dam was completed at the end of the previous fiscal year, except for the work of dressing the slopes, cleaning up, and removing material and equipment used in construction. During the month of July, 1910, the downstream slope of the dam, the crest, and the upstream slope from the crest at elevation 2,297 down to approximately elevation 2,270 were trimmed to the neat lines. From this point down, which will usually be below the water surface of the reservoir, the material was leveled off, giving this portion of the embankment a satisfactory appearance without the unnecessary time and expense of dressing it to neat lines. The total area dressed amounted to 26,900 square yards. The final work of dismantling, cleaning up, and storing tools and equipment was completed early in August.

Future work.—Plans and estimates have been made for the construction of the Pogue Wasteway, for the enlarging of several concrete culverts under the canals, and for the improvement of the headquarters buildings and grounds.

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OPERATION AND MAINTENANCE

During the irrigation season of 1910, which lasted from May 3 to the early part of September, the entire system, including 41 miles of canal, was operated, and 259 farm units, aggregating 4,420 acres of land, were irrigated. Approximately 19,200 acre-feet of water passed through the outlet tunnel of the Conconully Reservoir, 12,780 acre-feet being diverted to the main canal system and the remainder being diverted to the old ditches which take water out of the Salmon River above and below the diversion dam. A total of 6,980 acre-feet of water was served to the lands. Seepage and evaporation losses in the canals amounted to about 40 per cent, due to the fact that this was the first season for much of the system, that in many places the canals are built along side hills through gravelly soil, and that many of the smaller distributaries extend through sandy stretches. During the season a system of rotative water deliveries was practiced, which it is believed saved a great deal of water which would otherwise have been lost by seepage and evaporation. The lands of the project were divided into two districts which were served alternately in periods of eight days each, a 16-day supply being delivered during the 8-day periods. As only a relatively small proportion of the irrigable area was under cultivation, it was possible to deliver this double head without overtaxing the capacity of the canals. In portions of the system, where the seepage losses are excessive, conditions are being remedied by puddling or lining the canal sections with concrete. At the close of the 1910 irrigating season a 450-foot section of the upper main lateral was lined with concrete and the location of another portion was changed because of a break during the season.

SETTLEMENT AND IRRIGATION

The development of the project has been quite rapid, but was retarded somewhat by lack of railroad facilities, the lands being 50 miles from a railroad, and boat service on the Columbia River being maintained but three months of the year. A branch of the Great Northern Railroad has been graded along the Okanogan and Columbia Rivers from Oroville, on the main line north of the project, to Pateros, south of the project. The completion of this branch will aid greatly in the development of the region. The three towns on the project, Okanogan, Omak, and Riverside, have populations of 800, 400, and 500, respectively, and there are more than 1,200 people located on the farms.

At the close of the irrigating season of 1910, a total of 3,115 acres, or nearly one-third of the project lands, had been planted to orchard. During the year 169,250 fruit trees were planted, which, with those planted in previous years, aggregated 237,058. Apple trees largely predominate, as results obtained from bearing orchards indicate that the climatic conditions and soil are especially adapted to the growth of winter apples. There were 55 acres of bearing orchards, and other crops with large acreage were alfalfa, fodder corn, and wheat. The fruit yield was unusually large.

During the forepart of the season of 1911 all the orchards have made a splendid growth. A great many new trees were planted

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during the season and all appeared to be in good condition at the close of the fiscal year. Vegetables, alfalfa, and grain crops were in good condition.

PUBLIC NOTICE DATED FEBRUARY 23, 1911

In pursuance of the terms of the public notices issued November 12, 1908, andMarch 12, 1910, under the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), for the Okanogan project, Washington, it is hereby announced that the portion of the installment on account of operation and maintenance, to be due May 1, 1911, for the lands therein described, shall be $2 per acre of irrigable land and the said rate shall remain in force for subsequent years until further notice, the charges becoming due on May 1 of each year.

No water will be furnished for the irrigation season of 1911 for any lands unless the portion of the installment for operation and maintenance due May 1, 1911, has been paid and in like manner for subsequent years.

ORDER DATED MARCH 28, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under section 4 of the reclamation act and for other purposes," the following order is hereby promulgated for the purpose of relieving the present situation under the Okanogan project, pending the issuance of public notice modifying or abrogating the notices heretofore issued.

2. A stay of proceedings looking to the cancellation of entries or water-right applications because of failure to make payment of the building charge will become effective as to all entries and water-right applications subject to the public notices and orders heretofore issued upon the payment on or before May 1, 1911, of $1 per acre of irrigable land on account of the building charge, plus all charges for operation and maintenance which shall have become due on or before May 1, 1911, and subject also to compliance with the conditions of a public notice to be hereafter issued which will provide for an increased building charge of possibly $68 or $70 per acre, to be determined after further investigation. Such stay of proceedings shall remain in effect until further announcement by means of a public notice or otherwise.

3. Upon failure to make payment as herein required on or before May 1, 1911, the entry or water-right application or both, as the case may be, which would otherwise be subject to cancellation, will be promptly canceled.

4. All applications for water rights filed under the provisions of notices heretofore issued and for which the payment necessary to avoid cancellation shall have been made on or before May 1, 1911, shall be continued in effect under such prior notices.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Okanogan project

ASSETS

Accounts receivable:		
Collections by Land Office	$230.00	
Uncollected water-right building charges	96,861.40	
Uncollected water-right operation and maintenaance charges	147.50	
		$97,238.90
Inventories:		
Government animals	480.00	
Equipment in use	4,972.47	
Storehouse	1,019.25	
Cement	214.75	
Iron and steel	531.57	
Lumber	69.22	
Explosives	160.70	
Forage	10.43	
Fuel	9.54	
		7,467.93

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Cost of work:			
Building cost	$565,225.73		
Plus adjustments	193.83		
		$565,419.56	
Less accrued revenues		2,603.50	
			$562,816.06
Operation and maintenance cost		27,443.17	
Less accrued revenues		2,278.50	
			25,164.67
Total assets			692,687.56

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$591,852.54		
Transfer vouchers received	19,720.61		
		611,573.15	
Collection vouchers	63,971.13		
Transfer vouchers issued	7,735.53		
		71,706.66	
			539,866.49
Accounts payable:			
Unpaid freight and express		57.60	
Unpaid passenger fares		99.46	
Unpaid miscellaneous		570.54	
			727.60
Repayments accrued:			
Building		119,293.10	
Operation and maintenance		32,800.37	
			152,093.47
Total liabilities			692,687.56

Feature costs to June 30, 1911, Okanogan project

Storage works:		
Salmon Lake Reservoir—		
Inlet canal	$1,981.03	
Outlet canal	3,385.77	
		$5,366.80
Conconully Reservoir:		
Real estate	37,788.60	
Clearing site	8,832.93	
Conconully Dam (hydraulic fill)	219,837.46	
Spillway	37,431.29	
Outlet works	24,278.98	
		328,169.26
Diversion system:		
Weir	4,164.49	
Main canal, main laterals, and sublaterals	217,324.07	
		221,488.56
Roads, highways to dam site		1,096.05
Buildings, construction and maintenance		4,075.00
Telephone system:		
Construction	2,881.70	
Maintenance	7.50	
		2,889.20
Irrigable lands, farm units subdivision		1,889.92
Colville extension, examination		250.94
Total building cost		565,225.73
Operation and maintenance:		
Salmon Lake Reservoir	28.45	
Conconully Reservoir	735.00	
Diversion system	23,303.90	
Headquarters camp	2,839.46	
Telephone system	367.84	
Inventory of cost ledger supplies	168.52	
		27,443.17
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		592,668.90

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WASHINGTON, YAKIMA PROJECT

LOCATION AND CLIMATIC CONDITIONS

Counties: Yakima, Benton, and Kittitas.

Townships: 8 to 22 N., Rs. 11 to 25 E., Willamette meridian.

Railroads: Northern Pacific; Chicago, Milwaukee & St. Paul; and Oregon-Washington Railroad & Navigation Co.

Railroad stations: Grandview, Sunnyside, Outlook, Granger, Mabton, Prosser, Byron, Ellensburg, Thorp, Yakima, North Yakima, Naches, Alfalfa, Toppenish, and Parker, Wash.

Average elevation of irrigable area: 1,000 feet above sea level.

Average annual rainfall on irrigable area: 8 inches.

Range of temperature on irrigable area: −21° to 110°.

WATER SUPPLY

Source of water supply: Yakima River and its tributaries.

Area of drainage basin: 5,050 square miles.

Annual run-off in acre-feet of Yakima River at Union Gap (3,300 square miles), 1897 to 1910—maximum, 4,370,000; minimum, 2,440,000; mean, 3,430,000.

DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features.]

Reservoirs: Bumping Lake—area, 1,300 acres; capacity, 34,000 acre-feet; length of spillway, 235 feet; elevation of spillway, 40 feet above stream bed. Lake Clealum—area, 5,000 acres; capacity, 426,000 acre-feet; length of spillway, 407 feet; elevation of spillway, 130 feet above stream bed. Lake Kachess—area, 4,800 acres; capacity, 210,000 acre-feet; length of spillway, 250 feet; elevation of spillway, 58 feet above steam bed. Lake Keechelus—area, 2,600 acres; capacity, 142,000 acre-feet; length of spillway, 287 feet; elevation of spillway, 54 feet above stream bed. McAllister Meadows—area, 1,800 acres; capacity, 115,000 acre-feet; length of spillway, 250 feet; elevation of spillway, 150 feet above stream bed.

Storage dams: Bumping Lake—type, earth fill; maximum height, 45 feet; length of crest, 3,500 feet; volume, 233,800 cubic yards. Lake Clealum—type, earth fill; maximum height, 140 feet; length of crest, 1,200 feet; volume, 660,000 cubic yards. Lake Kachess—type, earth fill; maximum height, 68 feet; length of crest, 1,400 feet; volume, 220,000 cubic yards. Lake Keechelus—type, earth fill; maximum height, 64 feet; length of crest, 6,400 feet; volume, 480,000 cubic yards. McAllister Meadows—type, rock fill; maximum height, 160 feet; length of crest, 900 feet; volume 450,000 cubic yards.

Diversion dams: Sunnyside—type, concrete ogee weir; maximum height, 8 feet; length, 500 feet. Tieton River—type, concrete and rock-filled crib; maximum height, 3 feet; length of masonry, 110 feet; length of earth and rock fill, 320 feet. Wapato—type, concrete weir; maximum height, 8 feet; length of masonry, 500 feet.

Length of canals: Sunnyside unit—25 miles with capacities greater than 800 second-feet; 15 miles with capacities from 800 to 301 second-feet; 40 miles with capacities from 300 to 50 second-feet; 380 miles with capacities less than 50 second-feet. Tieton unit—12 miles with capacities greater than 300 second-feet; 35 miles with capacities from 300 to 50 second-feet; 240 miles with capacities less than 50 second-feet. Wapato unit—30 miles with capacities greater than 300 second-feet; 50 miles with capacities from 300 to 50 second-feet; 178 miles with capacities less than 50 second-feet.

Tunnels: Tieton unit, 6; aggregate length, 10,963 feet.

Dikes: Aggregate length—Sunnyside unit, 1,600 feet; Tieton unit, 350 feet; Wapato unit, 2,000 feet.

Water power: Estimated, 2,000 horsepower, Sunnyside unit; 4,000 horsepower, Tieton unit; and 9,000 horsepower, Wapato unit. None developed.

Irrigable area: Entire project, 309,128 acres; Sunnyside unit, 98,628 acres; Tieton unit, 34,500 acres; Wapato unit, 114,000 acres; Kittitas unit, 62,000 acres.

Present status of irrigable lands: Sunnyside unit—1,085 acres entered subject to the reclamation act; 6,710 acres withdrawn from entry; 2,880 acres of State lands; 87,953 acres in private ownership. Tieton unit—340 entered subject to the reclamation act; 50 acres open to entry; 1,631 acres withdrawn from entry; 2,274 acres of State lands; 30,205 acres in private ownership. Wapato unit—114,000 acres of Indian lands. Kittitas unit—none entered subject to the reclamation act or open to entry; 5,500 acres withdrawn from entry; 6,500 acres of State lands; 50,000 acres in private ownership.

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RESULTS TO JUNE 30, 1911

STORAGE UNIT

Storage dams: Earth—1, volume, 233,852 cubic yards; rock fill crib—3.
Bridges: Steel—1 with a length of 115 feet; wood—6 with lengths of 50 feet or more; total length, 470 feet.
Buildings: Residences, 2.
Roads: 46 miles.
Telephone lines: 49 miles. Telephones in use: 13.
Material excavated: Class 1, earth, 434,350 cubic yards; class 2, indurated material, 900 cubic yards; class 3, rock, 200 cubic yards.
Riprap: 11,190 cubic yards.
Paving: 5,322 square yards.
Cement used: 5,562 barrels.
Concrete placed: 3,764 cubic yards.

SUNNYSIDE UNIT

Canals: 25 miles with capacities of more than 800 second-feet; 15 miles with capacities from 301 to 800 second-feet; 40 miles with capacities from 50 to 300 second-feet; 380 miles with capacities less than 50 second-feet.
Diversion dams: Volume—masonry, 2,291 cubic yards.
Dikes or levees for protection from overflow: Total length, 1,600 feet; volume, 18,000 cubic yards.
Canal structures: 58 costing more than $2,000 each; 7 costing from $500 to $2,000 each; 101 costing less than $500 each, exclusive of minor structures.
Bridges: Steel—1 with a length of 500 feet; wood—7 with lengths of 50 feet or more; 20 with lengths of less than 50 feet; total length, 1,038 feet.
Buildings: Offices, 1; residences, 12; barns and storehouses, 4.
Telephone lines: 124 miles; telephones in use, 50.
Material excavated: Class 1—earth, 2,115,600 cubic yards; class 2—indurated material, 47,664 cubic yards; class 3—rock, 46,100 cubic yards.
Paving: 6,850 square yards.
Cement used: 17,390 barrels.
Concrete placed: 15,095 cubic yards.

TIETON UNIT

Canals: 12 miles with capacities from 301 to 800 second-feet; 35 miles with capacities from 50 to 300 second-feet; 189 miles with capacities less than 50 second-feet.
Tunnels: 6; total length, 10,963.
Diversion dams: Volume—masonry, 576 cubic yards; earth, 2,025 cubic yards; rock fill, 301 cubic yards.
Dikes or levees for protection from overflow: Total length, 350 feet; volume, 584 cubic yards.
Canal structures: 25 costing more than $2,000 each; 66 costing from $500 to $2,000 each; 358 (exclusive of measuring boxes and small structures) costing less than $500 each.
Bridges: Wood—6 with lengths of more than 50 feet; 100 with lengths of less than 50 feet; total length, 2,514 feet.
Buildings: Offices, 2; residences, including patrol houses, 9; barns and storehouses, 4.
Roads: 27 miles.
Telephone lines: 83 miles; telephones in use, 47.
Material excavated: Class 1, earth, 549,540 cubic yards; class 2, indurated material, 359,096 cubic yards; class 3, rock, 226,922 cubic yards.
Riprap: 5,423 cubic yards.
Paving: 17,059 square yards.
Cement used: 27,171 barrels.
Concrete placed: 19,930 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: Sunnyside unit—65,000 acres; Tieton unit—19,378 acres.
Area irrigated, season of 1911: Sunnyside unit—58,612 acres; Tieton unit—6,362 acres; Wapato unit—15,000 acres from Indian canals.

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Length of irrigating season: Sunnyside unit—from April 1 to October 31, 214 days. Tieton unit—from May 1 to September 30, 153 days.
Character of soil of irrigable area: Sandy loam, gravel, and volcanic ash.
Principal products: Forage, hops, fruits, and vegetables.
Principal markets: Seattle, Tacoma, and Spokane, Wash.; eastern cities.

LANDS OPENED FOR IRRIGATION

SUNNYSIDE UNIT

Dates of public notices: November 18, 1908; March 2, 1909; April 18, 1910; April 19, 1910; May 2, 1910; March 15, 1911.
Location of lands opened: Ts. 8 to 11 N., Rs. 20 to 25 E., Willamette meridian.
Present status of irrigable lands opened: 1,085 acres entered subject to the reclamation act; none open to entry; 6,710 acres withdrawn from entry; 550 acres of State lands; 69,905 acres in private ownership.
Duty of water: 3 acre-feet per acre per annum at the farm.
Limit of area of farm units: Public, 80 acres; private, 160 acres.
Building charge per acre of irrigable land: $52.
Annual operation and maintenance charge: $0.95 per acre of irrigable land.

TIETON UNIT

Dates of public notices and orders: November 7, 1910; March 8, 1911; April 14, 1911.
Location of lands opened: Ts. 13 to 15 N., Rs. 16 to 18 E., Willamette meridian.
Present status of irrigable lands opened: 342 acres entered subject to the Reclamation act; 50 acres open to entry; 1,514 acres of State lands; 17,472 acres in private ownership.
Duty of water: 2 acre-feet per acre per annum at the farm.
Limit of area of farm units: Public, 40 acres; private, 160 acres.
Building charge per acre of irrigable land, $93.
Annual operation and maintenance charge: $1.50 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnoissance and preliminary surveys begun in 1903.
Board report October 16, 1905.
Construction authorized by Secretary: Sunnyside and Tieton units, December 12, 1905; Wapato unit, June 16, 1906.
Sunnyside Canal purchased June 23, 1906.
Lake Kachess Dam (temporary crib) purchased December 12, 1906.
Lake Keechelus Dam (temporary crib) completed April. 1907.
Sunnyside Diversion Dam: Reconstruction completed October, 1907.
Lake Clealum Dam (temporary crib) completed November, 1907.
Tieton Diversion Dam completed December, 1908.
First irrigation by Reclamation Service: Sunnyside unit, season of 1907.
Tieton Main Canal completed in 1909.
Bumping Lake Dam completed December, 1910.
First irrigation by the Reclamation Service: Tieton unit, season of 1910.
Per cent completed June 30, 1911: Storage unit, 19; Sunnyside unit, 66; Tieton unit, 91.

IRRIGATION PLAN

The irrigation plan of the Yakima project provides for the storage of flood waters of Yakima River and its tributaries in Kachess, Keechelus, Clealum, and Bumping Lakes and in a reservoir at McAllister Meadows; the diversion of water from Yakima River for the irrigation of 62,000 acres of land on both sides of the river in the vicinity of Ellensburg, comprising the Kittitas unit; the diversion of water from the east bank of Yakima River near Parker for the irrigation of 100,000 acres of land watered by means of the old Sunnyside Canal as improved and extended by the Reclamation Service, comprising the Sunnyside unit; the diversion of water from Tieton River below McAlister Meadows for the irrigation of 34,500 acres of

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land lying between Naches River and Atanum Creek in the vicinity of North Yakima, comprising the Tieton unit; and the diversion of water from the west bank of Yakima River near Parker for the irrigation by means of the canal system of the Yakima Indian Reservation, as improved and extended by the Reclamation Service, of 100,000 acres of land by gravity and 14,000 acres of land by pumping with power developed at drops in the canals, comprising the Wapato unit. The plan also provides for the development of power from drops on the main canals and laterals of the Sunnyside and Tieton units to be used for pumping irrigation water and for other purposes.

The following features of the above irrigation plan have been completed: Sunnyside unit—diversion dam, enlargement of main canal (except between miles 16.5 and 23.25); Sulphur Creek Wasteway, and the Mabton and Prosser divisions of the distribution system. Tieton unit—Bumping Lake Storage Dam; diversion dam; main canal, Naches, and Cowiche-Yakima branches of the distribution system.

Construction work is in progress upon the following features: Storage unit—Kachess Dam; Sunnyside unit—improvement and enlargement of the Main Canal and the enlargement of Snipes Mountain Lateral and extensions of the distribution system; Tieton unit—Wide Hollow branch of distribution system.

The features for future construction are: Extension of the Sunnyside Canal and pumping distribution systems, construction of the Keechelus and Clealum Dams and McAllister Meadows Reservoir, and completion of Kittitas and Wapato units, upon which no work has thus far been undertaken.

CONSTRUCTION DURING FISCAL YEAR

Kachess Dam (storage unit).—This dam is located on Kachess River, about 1,700 feet below the outlet of Lake Kachess. The dam is to be of earth, to an elevation of 2,268, about 40 feet above the normal level of the lake. The outlet works will be constructed to draw off the water to elevation 2,193. The concrete conduit through the dam is horseshoe shape, 12 feet wide, 12 feet high, and 300 feet in length. At the upper end is to be located a concrete gate tower reached by a steel bridge from the embankment, and from which are controlled two sets of three gates each 4 feet wide and 10 feet high. Water is conducted to the outlet conduit from the lake through a dredged lake channel 1,200 feet long, a concrete approach conduit 1,400 feet long, and an open approach channel 265 feet long. Below the dam a paved open channel 700 feet long extends to the river. The spillway, having a crest at elevation 2,258, 10 feet below the top of the dam, is located in a saddle about 3,000 feet east of the dam. It is to be of plain concrete, 8 feet high, and 250 feet long between abutments, with a concrete apron extending 50 feet downstream from the crest. The construction of the storage works will greatly increase the capacity of Lake Kachess by making it possible to raise the water level about 30 feet above the normal, and at the same time the construction of the extensive appurtenant outlet works will make the natural storage of the lake available by lowering the outlet about 30 feet.

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Authority for the construction by Government forces of the portion of the storage works scheduled for that season was given by the Secretary of the Interior February 14, 1910. A camp was established in April, 1910, and by July 1, 1910, all preliminary work and building roads and bridges was completed. A temporary outlet channel 400 feet long and having a maximum cut of 25 feet was excavated at a point 300 feet east of the permanent outlet conduit in order to take care of the river during the construction period. This channel terminates in a 17-foot drop built of heavy log cribs filled with rock, with a waterway lined with two thicknesses of 2-inch planks. Excavation for the concrete approach conduit was begun with teams May 19, 1910, and a Lidgerwood excavator on September 26. Concreting of the approach conduit was begun December 15 and discontinued on January 7, 1911. During the season about 43,000 cubic yards of material was excavated and 400 cubic yards of concrete placed. Plans and specifications for the completion of the Kachess storage works were advertised and proposals opened on April 15, 1911. All bids were rejected, and on April 28 authority was given by the Secretary of the Interior to continue and complete the storage works by Government forces. Construction was resumed on March 14, and on June 30 excavation was in progress on the lake channel with an orange-peel dredge and on the trench for the approach conduit with the excavator, about half of the concrete approach conduit had been completed, work had been started on the cut-off trench for the dam, excavation for the outlet conduit and discharge channel with steam shovel was well advanced, and some excavation had been done at the spillway. Included in the work of the year is the clearing of 31 acres, the excavation of 150,000 cubic yards of material, and the placing of 791 cubic yards of concrete. Twenty-two per cent of the construction work in the dam and outlet works has been completed.

Sunnyside Canal system.—The Sulphur Creek Wasteway, which is a combined wasteway and drainage channel having a capacity of 515 second-feet, heads at the thirty-seventh milepost of the Main Canal. It is 8 miles in length and consists of a concrete section 1 mile long, a check basin, and an earth section 7 miles in length having 21 concrete drops. The earth section was begun by contract in August, 1908, and after being abandoned by two contractors in succession the work was completed by Government forces in October, 1910. This work required the excavation of 25 per cent of the wasteway and the construction of 19 of the 21 drops. The concrete section of the wasteway was begun by contract in September, 1909, and completed in December, 1910.

The enlargement of the Main Canal by the aid of the continuous-bucket dredge, a drag-bucket excavator, and by teams is still in progress. On June 30, 1911, there had been excavated in this work a total of more than a million and a half cubic yards, and there still remains about 7 miles of canals to be enlarged. The capacity of the canal at the head gates has been increased from 650 to 1,076 second-feet. The construction of concrete drops on the main canal has been completed and there are a few concrete culverts yet to be built for the passage of cross drainage. About one-half of the old wooden turnouts on the Main Canal have been replaced with permanent structures and there yet remains about 100 turnouts to be replaced.

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The Prosser division is located on the opposite side of the Yakima River from the Sunnyside Canal, and the irrigation scheme is similar to that for the Mabton division, there being an open feeder canal 456 feet long, 3,072 feet of 30½-inch concrete pipe, 7,500 feet of 31-inch wood stave pipe, a 4-span steel bridge 500 feet long, 1,664 feet of steel flume, and two main laterals running east and west, respectively. The work was begun in the fall of 1910 and completed on May 1, 1911. Excavation for pipe trench and laterals and construction of wood stave pipe and steel bridges were all done by contract, the remainder of the work being done by force account.

The Snipes Mountain Lateral is to be enlarged from a capacity of 100 second-feet to 160 second-feet, and preliminary to this work the wooden head works and several drops were replaced with concrete structures.

The distribution system had been extended to cover 4,000 acres on the 3½ mile main canal extension and 3,000 acres under the Mabton division previous to the spring of 1911. From January to June 30, 1911, the distribution system was extended to cover 2,000 additional acres each on the Mabton and Prosser divisions and 2,500 acres under the general system. There remain 12,000 acres (exclusive of pumping systems) to which the distribution system is being extended.

Tieton Canal system.—The main canal was completed in 1909. Of the three branches of the distribution system, the Naches Branch was completed in the spring of 1910; the Cowiche-Yakima Branch which was begun in the spring of 1910 was completed in the fall of the same year, and the Wide Hollow Branch, which was begun in December, 1910, will probably be completed in the fall of 1911, the work being still in progress. The excavation is being done by contract and the structures are being built by Government forces.

Bumping Lake Dam.—The Bumping Lake Dam, work upon which was begun May 17, 1909, was completed in November, 1910. The work was done by Government forces, and involved the placing of 233,800 cubic yards of material in embankment and 2,973 cubic yards of concrete in the outlet conduit, gate tower, and spillway. The dam is an earth-fill structure, 3,500 feet long, with a curved alignment in order to secure an economic fill. The outlet works consist of a circular reenforced-concrete conduit having an inside diameter of 7 feet and located near the center of the dam, and a concrete gate tower near the upper toe of the dam, from which two sets of gates are operated. The tower is connected with the crest of the dam by a steel footbridge. The spillway is located near the north end of the dam and consists of a concrete weir 235 feet long with a crest 7 feet below the level of the top of the dam. A channel 42 feet wide conducts the flood waters to a wooden flume 100 feet long leading to the Bumping River below the dam. The embankment was constructed by the combined dumping and sluicing method, the material being excavated by a steam shovel, hauled to the outer edges of the embankment, dumped toward the center and sluiced by water under pressure toward a settling basin along the center line of the embankment. The finer material formed a puddle core and the heavy gravel and bowlders remained near the outside. Forty per cent of the work was done during the season of 1909 with a force of 152 men and 93 horses. During the season of 1910 until completion a force of 250 men and 98 horses were employed.

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OPERATION AND MAINTENANCE

SUNNYSIDE UNIT

During the season of 1910, the following features of the Sunnyside unit were operated: Diversion works on Yakima River, Main Sunnyside Canal, Snipes Mountain, Rocky Ford, and Mabton Laterals, and the distribution system. An average of 652 second-feet of water was diverted into the main canal and about 51,000 acres of land were irrigated. The rotation system in delivery of water was adopted on the Mabton Lateral with very successful results. The amount of water used was reduced and crop results were gratifying. For a part of the system water was delivered to applicants under public notices dated November 18, 1908, March 2, 1909, and April 18, 1910. For the remainder of the system water was delivered under old water-right and rental contracts at $2.50 per acre for the season, for land irrigated.

During the season of 1911, 56,000 acres of land are being irrigated, an increase of 5,000 acres over the previous year. The Sulphur Creek Wasteway was turned over to the operating department. This wasteway serves to care for surplus water in the main canal and maintain a uniform flow. One serious break occurred in the Main Canal by which the entire flow of 480 second-feet was diverted through a draw into the Snipes Mountain lateral having a capacity of about 100 second-feet. Considerable damage was done, but repairs were made in the main canal within 48 hours and in the lateral in 4 days. Records are being kept of the delivery of water to each water user, and it is expected that an increased saving in water will result.

TIETON UNIT

Irrigation on the Tieton unit was begun on May 4, 1910, flood water being delivered under rental contracts until August 16, to about 1,660 acres of land. No storage was available during 1910 and it became necessary to close down the canal when the flow of the Tieton River reached a point where it was all appropriated. This season when the low flow is reached, storage water will be available so that regular irrigation for the first time will be continuous throughout the season. The length of the irrigation season has been fixed at 153 days, beginning May 1 and ending September 30. Water is now being served to 6,300 acres of land, being about equally divided between new and old lands. About 130 second-feet is being diverted, 65 per cent of which is being delivered to the land. The balance does not represent the losses, as considerable is being used on the Wide Hollow Branch for puddling and for construction purposes.

SETTLEMENT AND IRRIGATION

SUNNYSIDE UNIT

The general development and growth through all of the district irrigated from the Sunnyside Canal has continued at a very gratifying rate during the year ending June 30, 1911. A large number of new settlers have made their homes on the project and the process of dividing the larger holdings into tracts of from 5 to 40 acres has con-

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of any prior entries to the farm units shown thereon. Public notice as to such lands shown on these plats will be given at a later date, and such lands shall remain reserved from all forms of entry.

4. Water-right applications may be made for lands in private ownership and for lands heretofore entered (except for tracts rendered vacant by the conformation of any prior entries to the farm unit), and the time when payments will be due therefor is hereinafter stated.

5. In pursuance of contracts between the private landowners and the Tieton Water Users' Association, the maximum limit of area for which water-right application may be made for lands in private ownership shall be 80 acres of irrigable land for each landowner, except that water-right applications by purchasers of excess lands sold in accordance with the provisions of such contracts shall not exceed 40 acres of irrigable land.

6. The charges which shall be made per acre of irrigable land for lands heretofore entered or in private ownership which can be irrigated by the waters from the said irrigation project are in two parts as follows:

(*a*) The building of the irrigation system, $93 per acre of irrigable land, payable in not more than ten installments, each payment not less than $9.30, or some multiple thereof, per acre. Full payment may be made at any time of any balance of the building charge remaining due, after certification by the Commissioner of the General Land Office that full and satisfactory compliance has been shown with all the requirements of the law as to residence, cultivation and reclamation.

(*b*) For operation and maintenance for the irrigation season of 1911, and annually thereafter until further notice, $1.50 per acre of irrigable land, whether water is used thereon or not.

7. For lands in private ownership and for lands heretofore entered (except tracts rendered vacant by conformation), the first installment on account of said charges shall be due April 1, 1911, and the installments for the year 1912 and subsequent years shall be due on April 1 of each year thereafter until fully paid. Water-right applications filed in 1912 and subsequent years must be accompanied by payment of all installments for building, operation, and maintenance which have become due and remain unpaid for prior years.

8. All installments of the charges for the irrigable areas shown on these plats and covered by this notice, whether or not water-right application is made therefor or water used thereon, shall become due and payable as herein provided.

9. The regulation is hereby established that no water will be furnished in any year until all operation and maintenance charges levied for that year and for prior years shall have been paid in full. Accordingly no water will be furnished during the irrigation season of 1911 for any lands until the portion of the installment for operation and maintenance due on April 1, 1911, has been paid, and no water will be furnished in any subsequent irrigation season until payment has been made of the portion of the installment for operation and maintenance due April 1 of said year and prior years.

10. All charges are payable at the local land office, North Yakima, Wash.

11. Failure to make any two payments of the installments of charges when due shall render the water-right application subject to cancellation with forfeiture of all rights thereunder as well as of any moneys already paid thereon.

PUBLIC NOTICE DATED MARCH 8, 1911

In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), notice is hereby given as follows:

1. Water will be furnished from the Tieton unit, Yakima project, Washington, under the provisions of the reclamation act in the irrigation season of 1911 for the irrigable areas shown on farm unit plats of township 13 N., range 17 E.; township 13 N., range 18 E.; township 14 N., range 16 E.; township 14 N., range 17 E.; township 14 N., range 18 E.; township 15 N., range 16 E., Willamette meridian, approved by the Secretary of the Interior October 10, 1910, and on file in the local land office at North Yakima, Wash.

2. Homestead entries accompanied by applications for water rights and the first instalment of the charges for building, operation, and maintenance may be made at the local land office at North Yakima, Wash., on and after April 6, 1911, under the provisions of said act for the farm units shown on said plats.

3. Warning and notice are hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun prior to April 7, 1911, on any lands shown on said plats; provided, however, that this shall not interfere with any valid existing rights obtained by settlement or entry while the land was subject thereto.

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4. The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family on the lands entered subject to the provisions of the reclamation act is fixed at the amounts shown upon the plats for the several farm units.

5. The charges which shall be made per acre of irrigable land in the said entries which can be irrigated by the waters of the said irrigation project are in two parts, as follows:

(*a*) The building of the irrigation system, $93 per acre of irrigable land, payable in not more than 10 annual instalments, each payment not less than $9.30, or some multiple thereof, per acre. Full payment may be made at any time of any balance of the building charge remaining due, after certification by the Commissioner of the General Land Office that full and satisfactory compliance has been shown with all the requirements of the law as to residence, cultivation, and reclamation.

(*b*) For operation and maintenance for the irrigation season of 1911 and annually thereafter until further notice, $1.50 per acre of irrigable land, whether water is used thereon or not. As soon as the data are available the operation and maintenance charge will be fixed in proportion to the amount of water used, with a minimum charge per acre of irrigable land, whether water is used thereon or not.

6. All entries made hereafter for any of the lands described, whether for lands not heretofore entered, or for lands covered by prior entries which have been canceled by relinquishment or otherwise, shall be accompanied by applications for water rights in due form and by at least one instalment of the charges for building, operation, and maintenance, not less than $10.80 per acre of irrigable land, except where payments have been duly made by the prior applicants, and credits therefor duly assigned in writing. The second instalment of the building charge, not less than $9.30 per acre, and the appropriate charge for operation and maintenance shall become due on April 1 of the following year. Subsequent instalments of the building charge shall be due April 1 of each succeeding year until paid in full. All entries made and all water-right applications filed after April 6, 1911, for public or private lands, shall be accompanied by a payment equal to the sum of all instalments of the charges for building, operation, and maintenance which would have become due had the entry or water-right application been filed on April 6, 1911, or which in the case of a prior application were paid and were not duly assigned in writing.

7. All instalments of the charges for all irrigable areas shown on these plats, whether or not water-right application is made therefor or water used thereon, shall become due and are payable as herein provided.

8. The regulation is hereby established that no water will be furnished in any year until all operation and maintenance charges levied for that year and for prior years shall have been paid in full.

9. All charges are payable at the local land office, North Yakima, Wash.

10. Failure to make any two payments of the instalments of charges when due shall render the entry or application subject to cancellation with forfeiture of all rights under the entry or application, as well as of any moneys already paid thereon.

11. Nothing herein contained shall be construed as revoking any provision of the public notice of November 7, 1910, for the Tieton unit.

ORDER DATED APRIL 14, 1911

The public notice of November 7, 1910, for the Tieton unit, Yakima project, Washington, is hereby amended by substituting for paragraph 5 thereof the following:

5. Water-right applications may be accepted from the owners of private lands and for lands entered prior to November 7, 1910 (except for tracts rendered vacant by the conformation of any prior entries to the farm unit), for an irrigable acreage not in excess of 160 acres for each landowner.

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PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Yakima project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1911	Completion due
270	Feb. 1, 1909	Flanagan Mining Co.	Purchase of timber, Lake Keechelus Reservoir site.	$82,159.34	[1] $1,000.00	Feb. 1, 1919
276	Feb. 6, 1909	F. C. Westcott	Purchase of timber, Lake Kachess Reservoir site.	15,310.91	.....	Do.
277	Feb. 17, 1909	Jos. F. Walsh	Purchase of timber, Lake Clealum Reservoir site.	40,434.78	[1] 4,000.00	Feb. 17, 1919
287	May 3, 1909	The Bucyrus Co.	Steam dredge	28,005.00	[2] 28,265.94	Sept. 1, 1909
292	Aug. 28, 1909	Geo. Cooke & Sons	Sulphur Creek waste-way.	26,248.06	[2] 27,926.12	Dec. 29, 1910
293	Sept. 10, 1909	H. W. Hawley	Wasteway channel and masonry structures.	65,062.00	[3] 56,162.38	May 31, 1910
297	Sept. 17, 1909	D. H. Traphagen	Laterals, distributing system.	31,500.00	35,595.23	Apr. 15, 1910
342	Dec. 6, 1909	Nelson Rich	Earthwork, main laterals.	115,070.00	118,274.10	Oct. 19, 1911
343	Dec. 13, 1910	Pacific Tank & Pipe Co.	Wood stave pipe	17,901.00	[2] 17,787.70	May 12, 1911
344	Nov. 30, 1910	Bernard Bros	Pipe trench and canal excavation.	18,830.00	[2] 18,030.00	Apr. 27, 1911
345	Dec. 8, 1910	O. H. Stratton	Bridge girders	12,000.00	[2] 12,019.55	May 4, 1911
349	Jan. 20, 1911	Nelson Rich	Earthwork, sublaterals.	50,160.00	27,113.00	Oct. 9, 1911
352	Feb. 7, 1911	Chamberlain Construction Co.	Pipe and structures	14,078.25	6,258.32	June 1, 1911
353	Feb. 2, 1911	D. S. Wilson	Distributing system, excavation.	3,250.00	3,461.80	June 16, 1911
354	Feb. 15, 1911	Geo. F. Varnum	Pipe and structures	5,333.00	5,704.67	June 1, 1911
355	Feb. 2, 1911	D. S. Wilson	Canals and trenches	2,800.00	2,187.71	June 16, 1911
357	Mar. 9, 1911	R. H. Travers	Patrol houses	2,786.50	[2] 2,786.50	June 26, 1911

[1] Payments received to June 30, 1911. [2] Completed. [3] Suspended.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Yakima project

ASSETS

Accounts receivable:			
Uncollected freight refunds		$938.62	
Uncollected water rentals		18,427.17	
Uncollected miscellaneous		60,867.18	
Uncollected water-right building charges		221,851.40	
Uncollected water-right operation and maintenance charges		10,973.24	
			$313,057.61
Inventories:			
Mercantile store		4,469.23	
Government animals		47,269.90	
Equipment in use	$183,667.49		
Less depreciation	10,855.14		
		172,812.35	
Storehouse		43,029.65	
Cement		5,578.60	
Iron and steel		6,315.87	
Lumber		5,042.01	
Explosives		2,472.85	
Forage		4,728.45	
Fuel		2,108.28	

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Inventories—Continued.			
Cash in office safe		$497.43	
Local products		20,300.79	
Unadjusted transfers		187.34	
Freight and handling undistributed		1,771.76	
			$316,584.51
Cost of work:			
Building cost		5,120,690.16	
Less adjustments	135,917.94		
Less accrued revenues	32,665.91		
		168,583.85	
			4,952,106.31
Operation and maintenance cost		297,822.22	
Less accrued revenues		271,151.68	
			26,670.54
Total assets			5,608,418.97

LIABILITIES

Investment of the United States:			
Disbursement vouchers	5,130,258.70		
Transfer vouchers received	536,404.03		
		5,666,662.73	
Collection vouchers	632,141.72		
Transfer vouchers issued	129,339.18		
		761,480.90	
			4,905,181.83
Accounts payable:			
Unpaid labor		47,511.60	
Unpaid purchases		38,994.79	
Unpaid contract estimates		29,271.78	
Unpaid contract holdbacks		15,817.09	
Unpaid freight and express		16,228.54	
Unpaid passenger fares		651.67	
Unredeemed coupon books		407.00	
Unpaid miscellaneous		5,026.68	
			153,909.15
Repayments accrued:			
Building		474,160.65	
Operation and maintenance		75,167.34	
			549,327.99
Total liabilities			5,608,418.97

Feature costs to June 30, 1911, Yakima project

BENTON UNIT

Preliminary examination and surveys		$11,167.45

KITTITAS UNIT

Preliminary examination and surveys		19,344.90

STORAGE UNIT

Bumping Lake reservoir:		
Dam	$400,550.87	
General expense	10,176.29	
		410,727.16
McAllisters Meadows:		
Survey of dam site		8,993.79
Lakes Clealum, Keechelus, and Kachess:		
General expense	38,148.83	
Real estate, land submerged	20,996.07	
Crib dams, construction and maintenance	96,278.69	
Kachess Dam, permanent construction	113,407.96	
		268,831.55

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Wagon roads and highways, construction and maintenance:		
Bumping Lake	$64,646.03	
Tieton Valley	4,300.32	
		$68,946.35
Telephone system, construction and maintenance:		
Telephone line, Bumping Lake	7,895.95	
Telephone line, Clealum, Keechelus, and Kachess	428.27	
		8,324.22
Buildings:		
Camp at Bumping Lake, construction and maintenance	527.39	
Camp at McAllisters Meadows, construction and maintenance	765.80	
Camp at Lakes Clealum, Keechelus, and Kachess, construction and maintenance	11,434.18	
Watchman's house, Bumping Lake	693.11	
		13,420.48
Examination of unit:		
Reservoir reconnaissance		1,924.88
Inventory of cost ledger supplies		9,037.70
Total building cost		790,206.13

SUNNYSIDE UNIT

Diversion works:		
Dam and canal headworks		49,579.10
Canal system:		
Purchase price	248,690.64	
Main Canal	658,856.55	
Zillah Wasteway	30,711.55	
Mabton Pipe Line	214,575.54	
Sulphur Creek Wasteway	333,705.54	
Prosser extension to Main Canal	17,318.14	
Prosser Pipe Line	94,579.79	
Mabton Wasteway	1,749.54	
Snipes Mountain Lateral	17,438.78	
		1,617,626.07
Distributing system:		
Mabton division	51,720.93	
Prosser extension, Main Canal	17,871.24	
Snipes Mountain division	31,481.96	
Prosser division	11,202.60	
General distributing system	52,654.92	
		164,931.65
Pumping propositions:		
Outlook, examination	1,160.50	
Euclid, examination	1,037.60	
Section 26-9-23, examination	69.31	
		2,267.41
Buildings:		
Office and warehouse	6,105.62	
Patrol houses	10,775.86	
Warehouse and site	9,643.79	
		26,525.27
Irrigable lands:		
Farm units (subdivision)		16,384.03
Drainage investigation		8,512.35
Preliminary examination of unit as a whole		47,190.69
Telephone system:		
North Yakima and Sunnyside	7,530.58	
Prosser division	1,231.65	
		8,762.23

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Plant account:		
Construction	$8,093.48	
Maintenance	9,743.72	
		$17,837.20
Inventory of cost ledger supplies		5,056.05
Total building cost		1,964,672.05
Operation and maintenance:		
Operation	68,630.64	
Diversion dam and headworks, maintenance	1,460.72	
Main canal, maintenance	69,849.69	
Laterals, maintenance	55,642.76	
Spillway, maintenance	1,953.08	
General expense	84,191.41	
		281,728.30
Total cost of unit		2,246,400.35

TIETON UNIT

Diversion system:		
Dam	11,711.99	
Headworks	3,300.14	
		15,012.13
Tieton Main Canal:		
Earthwork, open canal	263,969.84	
Driving tunnels, and cost of power house, tramway, pipe and transmission line, construction, and maintenance	295,851.55	
Manufacturing and placing open canal and tunnel shapes	191,024.27	
Other structures, masonry, sand boxes, spillways, safety appliances, etc	86,251.98	
		837,097.64
Tieton Main Canal (schedules 6A and 7A):		
Manufacturing shapes for canal and tunnels	119,455.31	
Laying and joining shapes for canal and tunnels	93,153.65	
Plant, construction of, for making tunnel sections and open-canal shapes	15,899.75	
Plant, construction of, for laying tunnel sections and open canal shapes	20,098.98	
Extra work, including lining Trail Creek Tunnel	23,886.30	
		272,493.99
Distributing system:		
General expense, valley division	57,512.57	
Dam, North Fork No. 2, valley division	16,823.05	
Laterals	584,428.84	
Sublaterals	347,895.20	
		1,006,659.66
Wagon roads and highways, construction and maintenance:		
Tieton main canal	45,265.10	
Valley division, distributing system	2,691.92	
		47,957.02
Telephone system, construction and maintenance:		
Telephone line, Tieton Main Canal		20,650.00
Real estate (rights and property):		
Lands purchased for Tieton Main Canal		2,768.60
Buildings, construction, and maintenance:		
Patrol houses	27,085.06	
Distributing system camps	45,379.97	
		72,465.03
Examination of unit as a whole:		
Investigation		18,638.00
Inventory of cost ledger supplies		5,433.16
Total building cost		2,299,175.23

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Operation and maintenance:		
Operation of dams and headgates, wasteway, and main canal, including North Fork Channel	$745.58	
Operating laterals	1,050.77	
Operating sublaterals	856.15	
		$2,652.50
Maintenance of lake, dam, and reservoir	1,677.04	
Maintenance of dam and headworks, wasteways, and main canal, including North Fork Channel	786.39	
Maintenance of laterals	1,223.73	
Maintenance of buildings	1,119.48	
		4,806.64
General expense		8,359.39
Inventory of cost ledger supplies		275.39
Total operation and maintenance cost		16,093.92
Total building and operation and maintenance cost of unit		2,315,269.15

WAPATO UNIT

Examination of unit as a whole	31,447.86	
Real estate rights and property:		
Legal expense	58.45	
Preliminary investigations	4,618.09	
		36,124.40

RECAPITULATION BY UNITS

Building cost:		
Benton	11,167.45	
Kittitas	19,344.90	
Storage	790,206.13	
Sunnyside	1,964,672.05	
Tieton	2,299,175.23	
Wapato	36,124.40	
		5,120,690.16
Operation and maintenance cost:		
Sunnyside	281,728.30	
Tieton	16,093.92	
		297,822.22
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		5,418,512.38

WYOMING, SHOSHONE PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Park (Big Horn previous to Jan. 1, 1911).
Townships: 52 to 58 N., Rs. 97 to 104 W., sixth principal meridian.
Railroad: Chicago, Burlington & Quincy.
Railroad stations: Cody, Corbett, Ralston, Powell, Garland, Mantua, and Frannie, Wyo.
Average elevation of irrigable area: 4,500 feet above sea level.
Average annual rainfall on irrigable area: 5 inches.
Range of temperature on irrigable area: −31° to 101°.

WATER SUPPLY

Source of water supply: Shoshone River.
Area of drainage basin: 1,380 square miles.
Annual run-off in acre-feet of Shoshone River near Cody (1,380 square miles), 1902 to 1909—maximum, 1,420,000; minimum, 905,000; mean, 1,156,000.

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DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features.]

Reservoirs: Shoshone—area, 6,600 acres; capacity, 456,000 acre-feet; length of spillway, 300 feet; elevation of spillway, 233 feet above stream bed. Ralston—area, 200 acres; capacity, 2,100 acre-feet. (Utilized as a settling basin.)

Storage dams: Shoshone—type, rubble concrete arch; maximum height, 328 feet; length of crest, 200 feet; volume, 75,000 cubic yards. Ralston—type, earth embankment; maximum height, 38 feet; length of crest, 150 feet; volume, 24,740 cubic yards.

Diversion dam: Corbett—type, reinforced concrete weir; maximum height, 18 feet; length of masonry, 400 feet; length of earth fill, 450 feet; volume, concrete, 4,951 cubic yards; earth, 5,200 cubic yards.

Length of canals: 10 miles with capacities greater than 800 second-feet; 33 miles with capacities from 800 to 301 second-feet; 77 miles with capacities from 300 to 50 second-feet; 397 miles with capacities less than 50 second-feet.

Tunnels: Number, 11; aggregate length, 19,246 feet.

Power development: Not determined.

Irrigable area: Entire project, 164,122 acres; first unit, 15,237 acres; second unit, 16,117 acres; third unit, 3,736 acres; subsequent units, 129,032 acres.

Present status of irrigable lands (entire project): 19,988 acres entered subject to the reclamation act; 12,094 acres open to entry; 123,140 acres withdrawn from entry, 6,430 acres of State lands; 2,470 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 10 miles with capacities of more than 800 second-feet; 14 miles with capacities from 301 to 800 second-feet; 26 miles with capacities from 50 to 300 second-feet; 189 miles with capacities less than 50 second-feet.

Tunnels: Number, 11; total length, 19,246 feet.

Storage dams: Volume—concrete, 75,544 cubic yards. (Shoshone Dam and spillway weir.)

Diversion dams: Volume, concrete, 4,951 cubic yards.

Dikes or levees for protection from overflow: Total length, 450 feet; volume, 5,200 cubic yards.

Canal structures: 30 costing more than $2,000 each; 34 costing from $500 to $2,000 each; 842 costing less than $500 each.

Bridges: Steel—3 with lengths of more than 50 feet, 3 with lengths of less than 50 feet; total length, 316 feet. Wood—3 with lengths of more than 50 feet, 35 with lengths of less than 50 feet; total, 661 feet. Concrete—5 with total length of 44 feet.

Buildings: Offices, 3; residences, 35; barns and storehouses, 21.

Roads: 41 miles.

Telephone lines: 52 miles; telephones in use, 19.

Material excavated: Class 1, earth, 1,864,123 cubic yards; class 2, indurated material, 51,835 cubic yards; class 3, rock, 312,808 cubic yards.

Riprap: 2,444 cubic yards.

Paving: 11,838 square yards.

Cement used: 140,472 barrels.

Concrete placed: 120,068 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 34,852 acres.

Area irrigated, season of 1911: 14,580 acres.

Length of irrigating season: From April 15 to October 15—180 days.

Character of soil of irrigable area: Light sandy and clay loams.

Principal products: Alfalfa, grain, vegetables, and fruits.

Principal markets: Omaha, Nebr.; Kansas City, Mo.; Chicago, Ill.; Billings, Mont.; and local.

LANDS OPENED FOR IRRIGATION

Dates of public notices and orders relating thereto: November 25, 1907; April 3, 1908; May 8, 1909; February 6, 1911; March 25, 1911; and May 20, 1911.

Location of lands opened: Ts. 54 to 56 N., Rs. 98 to 100 W., sixth principal meridian.

Present status of irrigable lands opened: 19,988 acres entered subject to the reclamation act; 12,094 acres open to entry; 409 acres of State lands; 2,144 acres in private ownership.

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Limit of area of farm units: Public, 80 acres; private, 160 acres.
Duty of water: 2 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $45, $46, and $47, on first, second, and third units, respectively.
Annual operation and maintenance charge: $1 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnaissance made and preliminary surveys begun in 1903.
Construction authorized by Secretary February 10, 1904.
Corbett Diversion Dam completed June, 1907.
Corbett Tunnel completed November, 1907.
First irrigation by Reclamation Service season of 1908.
Garland Canal completed in 1909.
Shoshone Dam completed January, 1910.
Entire project 48 per cent completed June 30, 1911; first, second, and third units completed.

IRRIGATION PLAN

The irrigation plan of Shoshone project provides for the storage of flood waters of Shoshone River in a reservoir controlled by Shoshone Dam, about 8 miles above Cody, Wyo.; the diversion of water from Shoshone River, by a dam at Corbett; about 16 miles below the reservoir, and through the Corbett Tunnel into a canal system supplying water to lands on the north side of the river in the vicinity of Ralston, Powell, Garland, Mantua, and Frannie; the diversion into the Willwood Canal for the irrigation of lands on the south side of the Shoshone River; and the diversion into the north side high line from the Shoshone Dam for the irrigation of lands lying on the north side of the Shoshone River above the Garland Canal system and extending from the lower end of the Shoshone Canyon near Cody to the divide between the Shoshone River and Clarks Fork drainage.

The Shoshone Dam, Corbett Dam, Corbett Tunnel, Garland Canal, about 12 miles of the Frannie Canal, and the lateral and distributary system for approximately 45,000 acres in the vicinity of Ralston, Powell, and Garland, Wyo., have been completed with the exception of a few minor structures. These structures are now being built and will be completed the present season.

Future operations include the construction of the high line canal, the Willwood Canal, and the extension of the Frannie Canal to cover lands in the vicinity of Frannie, Wyo.

CONSTRUCTION DURING FISCAL YEAR

Distribution system.—During the past year the structural work in connection with the third unit was completed by force account, and the few remaining small structures within the area of the second unit were completed. Lateral A was constructed by Government forces as far as Station 64 in 1908 and was extended under contract to Station 322 during the fall and winter of 1910. This lateral has an initial capacity of 100 second-feet and reduces to 60 second-feet capacity in the length constructed. It is proposed to extend this lateral to a total length of about 14 miles.

The Frannie Canal, constructed from its intake to Station 650 under contracts completed in May, 1911, has a capacity of 550 second-feet at the head and reduces to 440 second-feet in the length constructed. The canal will irrigate about 8,500 acres in the vicinity of

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Powell, Wyo., and will be extended into the Sage Creek Valley and furnish water to about 30,000 or 40,000 acres in the vicinity of Frannie, Wyo.

The distributing ditches also constructed under contract cover lands north and west of Powell, Wyo., under the constructed portions of the Frannie Canal and Lateral A.

The concrete structures on these canals and laterals are being built by force account and were 33 per cent completed on June 30, 1911. To facilitate the measurement of water, weirs have been constructed at the head of nearly all of the Garland Canal laterals and in many of the distributing ditches. A considerable number of minor structures for protecting ditches against erosion have been constructed.

OPERATION AND MAINTENANCE

During the season of 1910 the Shoshone Dam, Corbett diversion works, Garland Canal, 10 main laterals and 66 distributaries, including 110 miles of canal, were operated, and 275 farms, aggregating 14,700 acres, were irrigated, being an increase of about 5,000 acres over the previous season. At the Corbett diversion works 48,241 acre-feet were diverted from the river, of which 37,548 acre-feet were delivered to the laterals and 30,351 acre-feet to the farms.

At the close of the irrigation season of 1910 repairs were made to several storm water culverts and the outlet culvert of Ralston Reservoir, canal banks were protected with riprap and brush, the outlet tower of Ralston Reservoir was strengthened with a ring of reenforced concrete 1 foot thick and 21 feet high, and canals were cleaned and repaired. The irrigation season of 1911 began on April 20 and the service was prepared to irrigate 34,852 acres of land. On June 30, 1911, 14,580 acres were being irrigated, 21,944 acre-feet of water had been diverted from the Shoshone River, and 12,189 acre-feet had been delivered to the farms. Storage in the reservoir amounted to 280,000 acre-feet.

SETTLEMENT AND IRRIGATION

The settlement on the project indicates a steady and healthy growth. During the fiscal year 59 farm units had been entered with an aggregate area of 3,436 acres and on June 30, 1911, 337 farm units aggregating 19,988 acres had been entered subject to the reclamation act and water-right applications had been received for 520 acres in private ownership. The population of the farms of the project is about 1,500, and the town of Powell is growing rapidly. On June 23 the Ralston unit of the project was opened.

The estimated total value of crops grown in 1910 was about $125,000. Alfalfa was a very successful crop, the acreage being increased from 1,600 to 5,000 acres and three cuttings were obtained. Large acreage was devoted to oats, wheat, and potatoes.

The first cutting of alfalfa for 1911 has been made and indicates that the crop will be heavier than in 1910. All other crops are in better condition than at the same time last year. A large number of apple trees have been set out on the project and are in excellent condition and show a healthy, vigorous growth.

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of any prior entries to the farm units shown thereon. Public notice as to such lands shown on these plats will be given at a later date, and such lands shall remain reserved from all forms of entry.

4. Water-right applications may be made for lands in private ownership and for lands heretofore entered (except for tracts rendered vacant by the conformation of any prior entries to the farm unit), and the time when payments will be due therefor is hereinafter stated.

5. In pursuance of contracts between the private landowners and the Tieton Water Users' Association, the maximum limit of area for which water-right application may be made for lands in private ownership shall be 80 acres of irrigable land for each landowner, except that water-right applications by purchasers of excess lands sold in accordance with the provisions of such contracts shall not exceed 40 acres of irrigable land.

6. The charges which shall be made per acre of irrigable land for lands heretofore entered or in private ownership which can be irrigated by the waters from the said irrigation project are in two parts as follows:

(*a*) The building of the irrigation system, $93 per acre of irrigable land, payable in not more than ten installments, each payment not less than $9.30, or some multiple thereof, per acre. Full payment may be made at any time of any balance of the building charge remaining due, after certification by the Commissioner of the General Land Office that full and satisfactory compliance has been shown with all the requirements of the law as to residence, cultivation and reclamation.

(*b*) For operation and maintenance for the irrigation season of 1911, and annually thereafter until further notice, $1.50 per acre of irrigable land, whether water is used thereon or not.

7. For lands in private ownership and for lands heretofore entered (except tracts rendered vacant by conformation), the first installment on account of said charges shall be due April 1, 1911, and the installments for the year 1912 and subsequent years shall be due on April 1 of each year thereafter until fully paid. Water-right applications filed in 1912 and subsequent years must be accompanied by payment of all installments for building, operation, and maintenance which have become due and remain unpaid for prior years.

8. All installments of the charges for the irrigable areas shown on these plats and covered by this notice, whether or not water-right application is made therefor or water used thereon, shall become due and payable as herein provided.

9. The regulation is hereby established that no water will be furnished in any year until all operation and maintenance charges levied for that year and for prior years shall have been paid in full. Accordingly no water will be furnished during the irrigation season of 1911 for any lands until the portion of the installment for operation and maintenance due on April 1, 1911, has been paid, and no water will be furnished in any subsequent irrigation season until payment has been made of the portion of the installment for operation and maintenance due April 1 of said year and prior years.

10. All charges are payable at the local land office, North Yakima, Wash.

11. Failure to make any two payments of the installments of charges when due shall render the water-right application subject to cancellation with forfeiture of all rights thereunder as well as of any moneys already paid thereon.

PUBLIC NOTICE DATED MARCH 8, 1911

In pursuance of the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), notice is hereby given as follows:

1. Water will be furnished from the Tieton unit, Yakima project, Washington, under the provisions of the reclamation act in the irrigation season of 1911 for the irrigable areas shown on farm unit plats of township 13 N., range 17 E.; township 13 N., range 18 E.; township 14 N., range 16 E.; township 14 N., range 17 E.; township 14 N., range 18 E.; township 15 N., range 16 E., Willamette meridian, approved by the Secretary of the Interior October 10, 1910, and on file in the local land office at North Yakima, Wash.

2. Homestead entries accompanied by applications for water rights and the first instalment of the charges for building, operation, and maintenance may be made at the local land office at North Yakima, Wash., on and after April 6, 1911, under the provisions of said act for the farm units shown on said plats.

3. Warning and notice are hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun prior to April 7, 1911, on any lands shown on said plats; provided, however, that this shall not interfere with any valid existing rights obtained by settlement or entry while the land was subject thereto.

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4. The limit of area per entry representing the acreage which, in the opinion of the Secretary of the Interior, may be reasonably required for the support of a family on the lands entered subject to the provisions of the reclamation act is fixed at the amounts shown upon the plats for the several farm units.

5. The charges which shall be made per acre of irrigable land in the said entries which can be irrigated by the waters of the said irrigation project are in two parts, as follows:

(*a*) The building of the irrigation system, $93 per acre of irrigable land, payable in not more than 10 annual instalments, each payment not less than $9.30, or some multiple thereof, per acre. Full payment may be made at any time of any balance of the building charge remaining due, after certification by the Commissioner of the General Land Office that full and satisfactory compliance has been shown with all the requirements of the law as to residence, cultivation, and reclamation.

(*b*) For operation and maintenance for the irrigation season of 1911 and annually thereafter until further notice, $1.50 per acre of irrigable land, whether water is used thereon or not. As soon as the data are available the operation and maintenance charge will be fixed in proportion to the amount of water used, with a minimum charge per acre of irrigable land, whether water is used thereon or not.

6. All entries made hereafter for any of the lands described, whether for lands not heretofore entered, or for lands covered by prior entries which have been canceled by relinquishment or otherwise, shall be accompanied by applications for water rights in due form and by at least one instalment of the charges for building, operation, and maintenance, not less than $10.80 per acre of irrigable land, except where payments have been duly made by the prior applicants, and credits therefor duly assigned in writing. The second instalment of the building charge, not less than $9.30 per acre, and the appropriate charge for operation and maintenance shall become due on April 1 of the following year. Subsequent instalments of the building charge shall be due April 1 of each succeeding year until paid in full. All entries made and all water-right applications filed after April 6, 1911, for public or private lands, shall be accompanied by a payment equal to the sum of all instalments of the charges for building, operation, and maintenance which would have become due had the entry or water-right application been filed on April 6, 1911, or which in the case of a prior application were paid and were not duly assigned in writing.

7. All instalments of the charges for all irrigable areas shown on these plats, whether or not water-right application is made therefor or water used thereon, shall become due and are payable as herein provided.

8. The regulation is hereby established that no water will be furnished in any year until all operation and maintenance charges levied for that year and for prior years shall have been paid in full.

9. All charges are payable at the local land office, North Yakima, Wash.

10. Failure to make any two payments of the instalments of charges when due shall render the entry or application subject to cancellation with forfeiture of all rights under the entry or application, as well as of any moneys already paid thereon.

11. Nothing herein contained shall be construed as revoking any provision of the public notice of November 7, 1910, for the Tieton unit.

ORDER DATED APRIL 14, 1911

The public notice of November 7, 1910, for the Tieton unit, Yakima project, Washington, is hereby amended by substituting for paragraph 5 thereof the following:

5. Water-right applications may be accepted from the owners of private lands and for lands entered prior to November 7, 1910 (except for tracts rendered vacant by the conformation of any prior entries to the farm unit), for an irrigable acreage not in excess of 160 acres for each landowner.

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PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Yakima project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1911	Completion due
270	Feb. 1, 1909	Flanagan Mining Co.	Purchase of timber, Lake Keechelus Reservoir site.	$82,159.34	[1] $1,000.00	Feb. 1, 1919
276	Feb. 6, 1909	F. C. Westcott	Purchase of timber, Lake Kachess Reservoir site.	15,310.91	.....	Do.
277	Feb. 17, 1909	Jos. F. Walsh	Purchase of timber, Lake Clealum Reservoir site.	40,434.78	[1] 4,000.00	Feb. 17, 1919
287	May 3, 1909	The Bucyrus Co.	Steam dredge	28,005.00	[2] 28,265.94	Sept. 1, 1909
292	Aug. 28, 1909	Geo. Cooke & Sons	Sulphur Creek waste-way.	26,248.06	[2] 27,926.12	Dec. 29, 1910
293	Sept. 10, 1909	H. W. Hawley	Wasteway channel and masonry structures.	65,062.00	[2] 56,162.38	May 31, 1910
297	Sept. 17, 1909	D. H. Traphagen	Laterals, distributing system.	31,500.00	35,595.23	Apr. 15, 1910
342	Dec. 6, 1909	Nelson Rich	Earthwork, main laterals.	115,070.00	118,274.10	Oct. 19, 1911
343	Dec. 13, 1910	Pacific Tank & Pipe Co.	Wood stave pipe	17,901.00	[2] 17,787.70	May 12, 1911
344	Nov. 30, 1910	Bernard Bros	Pipe trench and canal excavation.	18,830.00	[2] 18,030.00	Apr. 27, 1911
345	Dec. 8, 1910	O. H. Stratton	Bridge girders	12,000.00	[2] 12,019.55	May 4, 1911
349	Jan. 20, 1911	Nelson Rich	Earthwork, sublaterals.	50,160.00	27,113.00	Oct. 9, 1911
352	Feb. 7, 1911	Chamberlain Construction Co.	Pipe and structures	14,078.25	6,258.32	June 1, 1911
353	Feb. 2, 1911	D. S. Wilson	Distributing system, excavation.	3,250.00	3,461.80	June 16, 1911
354	Feb. 15, 1911	Geo. F. Varnum	Pipe and structures	5,333.00	5,704.67	June 1, 1911
355	Feb. 2, 1911	D. S. Wilson	Canals and trenches	2,800.00	2,187.71	June 16, 1911
357	Mar. 9, 1911	R. H. Travers	Patrol houses	2,786.50	[2] 2,786.50	June 26, 1911

[1] Payments received to June 30, 1911. [2] Completed. [3] Suspended.

FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Yakima project

ASSETS

Accounts receivable:		
Uncollected freight refunds		$938.62
Uncollected water rentals		18,427.17
Uncollected miscellaneous		60,867.18
Uncollected water-right building charges		221,851.40
Uncollected water-right operation and maintenance charges		10,973.24
		$313,057.61
Inventories:		
Mercantile store		4,469.23
Government animals		47,269.90
Equipment in use	$183,667.49	
Less depreciation	10,855.14	
		172,812.35
Storehouse		43,029.65
Cement		5,578.60
Iron and steel		6,315.87
Lumber		5,042.01
Explosives		2,472.85
Forage		4,728.45
Fuel		2,108.28

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Inventories—Continued.			
Cash in office safe		$497.43	
Local products		20,300.79	
Unadjusted transfers		187.34	
Freight and handling undistributed		1,771.76	
			$316,584.51
Cost of work:			
Building cost		5,120,690.16	
Less adjustments	135,917.94		
Less accrued revenues	32,665.91		
		168,583.85	
			4,952,106.31
Operation and maintenance cost		297,822.22	
Less accrued revenues		271,151.68	
			26,670.54
Total assets			5,608,418.97

LIABILITIES

Investment of the United States:			
Disbursement vouchers	5,130,258.70		
Transfer vouchers received	536,404.03		
		5,666,662.73	
Collection vouchers	632,141.72		
Transfer vouchers issued	129,339.18		
		761,480.90	
			4,905,181.83
Accounts payable:			
Unpaid labor		47,511.60	
Unpaid purchases		38,994.79	
Unpaid contract estimates		29,271.78	
Unpaid contract holdbacks		15,817.09	
Unpaid freight and express		16,228.54	
Unpaid passenger fares		651.67	
Unredeemed coupon books		407.00	
Unpaid miscellaneous		5,026.68	
			153,909.15
Repayments accrued:			
Building		474,160.65	
Operation and maintenance		75,167.34	
			549,327.99
Total liabilities			5,608,418.97

Feature costs to June 30, 1911, Yakima project

BENTON UNIT

Preliminary examination and surveys			$11,167.45

KITTITAS UNIT

Preliminary examination and surveys			19,344.90

STORAGE UNIT

Bumping Lake reservoir:			
Dam		$400,550.87	
General expense		10,176.29	
			410,727.16
McAllisters Meadows:			
Survey of dam site			8,993.79
Lakes Clealum, Keechelus, and Kachess:			
General expense		38,148.83	
Real estate, land submerged		20,996.07	
Crib dams, construction and maintenance		96,278.69	
Kachess Dam, permanent construction		113,407.96	
			268,831.55

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Wagon roads and highways, construction and maintenance:		
Bumping Lake	$64,646.03	
Tieton Valley	4,300.32	
		$68,946.35
Telephone system, construction and maintenance:		
Telephone line, Bumping Lake	7,895.95	
Telephone line, Clealum, Keechelus, and Kachess	428.27	
		8,324.22
Buildings:		
Camp at Bumping Lake, construction and maintenance	527.39	
Camp at McAllisters Meadows, construction and maintenance	765.80	
Camp at Lakes Clealum, Keechelus, and Kachess, construction and maintenance	11,434.18	
Watchman's house, Bumping Lake	693.11	
		13,420.48
Examination of unit:		
Reservoir reconnaissance		1,924.88
Inventory of cost ledger supplies		9,037.70
Total building cost		790,206.13

SUNNYSIDE UNIT

Diversion works:		
Dam and canal headworks		49,579.10
Canal system:		
Purchase price	248,690.64	
Main Canal	658,856.55	
Zillah Wasteway	30,711.55	
Mabton Pipe Line	214,575.54	
Sulphur Creek Wasteway	333,705.54	
Prosser extension to Main Canal	17,318.14	
Prosser Pipe Line	94,579.79	
Mabton Wasteway	1,749.54	
Snipes Mountain Lateral	17,438.78	
		1,617,626.07
Distributing system:		
Mabton division	51,720.93	
Prosser extension, Main Canal	17,871.24	
Snipes Mountain division	31,481.96	
Prosser division	11,202.60	
General distributing system	52,654.92	
		164,931.65
Pumping propositions:		
Outlook, examination	1,160.50	
Euclid, examination	1,037.60	
Section 26-9-23, examination	69.31	
		2,267.41
Buildings:		
Office and warehouse	6,105.62	
Patrol houses	10,775.86	
Warehouse and site	9,643.79	
		26,525.27
Irrigable lands:		
Farm units (subdivision)		16,384.03
Drainage investigation		8,512.35
Preliminary examination of unit as a whole		47,190.69
Telephone system:		
North Yakima and Sunnyside	7,530.58	
Prosser division	1,231.65	
		8,762.23

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Plant account:		
Construction	$8,093.48	
Maintenance	9,743.72	
		$17,837.20
Inventory of cost ledger supplies		5,056.05
Total building cost		1,964,672.05
Operation and maintenance:		
Operation	68,630.64	
Diversion dam and headworks, maintenance	1,460.72	
Main canal, maintenance	69,849.69	
Laterals, maintenance	55,642.76	
Spillway, maintenance	1,953.08	
General expense	84,191.41	
		281,728.30
Total cost of unit		2,246,400.35

TIETON UNIT

Diversion system:		
Dam	11,711.99	
Headworks	3,300.14	
		15,012.13
Tieton Main Canal:		
Earthwork, open canal	263,969.84	
Driving tunnels, and cost of power house, tramway, pipe and transmission line, construction, and maintenance	295,851.55	
Manufacturing and placing open canal and tunnel shapes	191,024.27	
Other structures, masonry, sand boxes, spillways, safety appliances, etc	86,251.98	
		837,097.64
Tieton Main Canal (schedules 6A and 7A):		
Manufacturing shapes for canal and tunnels	119,455.31	
Laying and joining shapes for canal and tunnels	93,153.65	
Plant, construction of, for making tunnel sections and open-canal shapes	15,899.75	
Plant, construction of, for laying tunnel sections and open canal shapes	20,098.98	
Extra work, including lining Trail Creek Tunnel	23,886.30	
		272,493.99
Distributing system:		
General expense, valley division	57,512.57	
Dam, North Fork No. 2, valley division	16,823.05	
Laterals	584,428.84	
Sublaterals	347,895.20	
		1,006,659.66
Wagon roads and highways, construction and maintenance:		
Tieton main canal	45,265.10	
Valley division, distributing system	2,691.92	
		47,957.02
Telephone system, construction and maintenance:		
Telephone line, Tieton Main Canal		20,650.00
Real estate (rights and property):		
Lands purchased for Tieton Main Canal		2,768.60
Buildings, construction, and maintenance:		
Patrol houses	27,085.06	
Distributing system camps	45,379.97	
		72,465.03
Examination of unit as a whole:		
Investigation		18,638.00
Inventory of cost ledger supplies		5,433.16
Total building cost		2,299,175.23

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Operation and maintenance:		
Operation of dams and headgates, wasteway, and main canal, including North Fork Channel	$745.58	
Operating laterals	1,050.77	
Operating sublaterals	856.15	
		$2,652.50
Maintenance of lake, dam, and reservoir	1,677.04	
Maintenance of dam and headworks, wasteways, and main canal, including North Fork Channel	786.39	
Maintenance of laterals	1,223.73	
Maintenance of buildings	1,119.48	
		4,806.64
General expense		8,359.39
Inventory of cost ledger supplies		275.39
Total operation and maintenance cost		16,093.92
Total building and operation and maintenance cost of unit		2,315,269.15

WAPATO UNIT

Examination of unit as a whole	31,447.86	
Real estate rights and property:		
Legal expense	58.45	
Preliminary investigations	4,618.09	
		36,124.40

RECAPITULATION BY UNITS

Building cost:		
Benton	11,167.45	
Kittitas	19,344.90	
Storage	790,206.13	
Sunnyside	1,964,672.05	
Tieton	2,299,175.23	
Wapato	36,124.40	
		5,120,690.16
Operation and maintenance cost:		
Sunnyside	281,728.30	
Tieton	16,093.92	
		297,822.22
Total building and operation and maintenance cost, as per debit in cost of work in statement of assets and liabilities		5,418,512.38

WYOMING, SHOSHONE PROJECT

LOCATION AND CLIMATIC CONDITIONS

County: Park (Big Horn previous to Jan. 1, 1911).
Townships: 52 to 58 N., Rs. 97 to 104 W., sixth principal meridian.
Railroad: Chicago, Burlington & Quincy.
Railroad stations: Cody, Corbett, Ralston, Powell, Garland, Mantua, and Frannie, Wyo.
Average elevation of irrigable area: 4,500 feet above sea level.
Average annual rainfall on irrigable area: 5 inches.
Range of temperature on irrigable area: −31° to 101°.

WATER SUPPLY

Source of water supply: Shoshone River.
Area of drainage basin: 1,380 square miles.
Annual run-off in acre-feet of Shoshone River near Cody (1,380 square miles), 1902 to 1909—maximum, 1,420,000; minimum, 905,000; mean, 1,156,000.

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DATA FOR COMPLETE PROJECT

[Estimated for uncompleted features.]

Reservoirs: Shoshone—area, 6,600 acres; capacity, 456,000 acre-feet; length of spillway, 300 feet; elevation of spillway, 233 feet above stream bed. Ralston—area, 200 acres; capacity, 2,100 acre-feet. (Utilized as a settling basin.)

Storage dams: Shoshone—type, rubble concrete arch; maximum height, 328 feet; length of crest, 200 feet; volume, 75,000 cubic yards. Ralston—type, earth embankment; maximum height, 38 feet; length of crest, 150 feet; volume, 24,740 cubic yards.

Diversion dam: Corbett—type, reinforced concrete weir; maximum height, 18 feet; length of masonry, 400 feet; length of earth fill, 450 feet; volume, concrete, 4,951 cubic yards; earth, 5,200 cubic yards.

Length of canals: 10 miles with capacities greater than 800 second-feet; 33 miles with capacities from 800 to 301 second-feet; 77 miles with capacities from 300 to 50 second-feet; 397 miles with capacities less than 50 second-feet.

Tunnels: Number, 11; aggregate length, 19,246 feet.

Power development: Not determined.

Irrigable area: Entire project, 164,122 acres; first unit, 15,237 acres; second unit, 16,117 acres; third unit, 3,736 acres; subsequent units, 129,032 acres.

Present status of irrigable lands (entire project): 19,988 acres entered subject to the reclamation act; 12,094 acres open to entry; 123,140 acres withdrawn from entry, 6,430 acres of State lands; 2,470 acres in private ownership.

RESULTS TO JUNE 30, 1911

Canals: 10 miles with capacities of more than 800 second-feet; 14 miles with capacities from 301 to 800 second-feet; 26 miles with capacities from 50 to 300 second-feet; 189 miles with capacities less than 50 second-feet.

Tunnels: Number, 11; total length, 19,246 feet.

Storage dams: Volume—concrete, 75,544 cubic yards. (Shoshone Dam and spillway weir.)

Diversion dams: Volume, concrete, 4,951 cubic yards.

Dikes or levees for protection from overflow: Total length, 450 feet; volume, 5,200 cubic yards.

Canal structures: 30 costing more than $2,000 each; 34 costing from $500 to $2,000 each; 842 costing less than $500 each.

Bridges: Steel—3 with lengths of more than 50 feet, 3 with lengths of less than 50 feet; total length, 316 feet. Wood—3 with lengths of more than 50 feet, 35 with lengths of less than 50 feet; total, 661 feet. Concrete—5 with total length of 44 feet.

Buildings: Offices, 3; residences, 35; barns and storehouses, 21.

Roads: 41 miles.

Telephone lines: 52 miles; telephones in use, 19.

Material excavated: Class 1, earth, 1,864,123 cubic yards; class 2, indurated material, 51,835 cubic yards; class 3, rock, 312,808 cubic yards.

Riprap: 2,444 cubic yards.

Paving: 11,838 square yards.

Cement used: 140,472 barrels.

Concrete placed: 120,068 cubic yards.

AGRICULTURAL CONDITIONS

Area for which the service is prepared to supply water, season of 1911: 34,852 acres.

Area irrigated, season of 1911: 14,580 acres.

Length of irrigating season: From April 15 to October 15—180 days.

Character of soil of irrigable area: Light sandy and clay loams.

Principal products: Alfalfa, grain, vegetables, and fruits.

Principal markets: Omaha, Nebr.; Kansas City, Mo.; Chicago, Ill.; Billings, Mont.; and local.

LANDS OPENED FOR IRRIGATION

Dates of public notices and orders relating thereto: November 25, 1907; April 3, 1908; May 8, 1909; February 6, 1911; March 25, 1911; and May 20, 1911.

Location of lands opened: Ts. 54 to 56 N., Rs. 98 to 100 W., sixth principal meridian.

Present status of irrigable lands opened: 19,988 acres entered subject to the reclamation act; 12,094 acres open to entry; 409 acres of State lands; 2,144 acres in private ownership.

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Limit of area of farm units: Public, 80 acres; private, 160 acres.
Duty of water: 2 acre-feet per acre per annum at the farm.
Building charge per acre of irrigable land: $45, $46, and $47, on first, second, and third units, respectively.
Annual operation and maintenance charge: $1 per acre of irrigable land.

CHRONOLOGICAL SUMMARY

Reconnaissance made and preliminary surveys begun in 1903.
Construction authorized by Secretary February 10, 1904.
Corbett Diversion Dam completed June, 1907.
Corbett Tunnel completed November, 1907.
First irrigation by Reclamation Service season of 1908.
Garland Canal completed in 1909.
Shoshone Dam completed January, 1910.
Entire project 48 per cent completed June 30, 1911; first, second, and third units completed.

IRRIGATION PLAN

The irrigation plan of Shoshone project provides for the storage of flood waters of Shoshone River in a reservoir controlled by Shoshone Dam, about 8 miles above Cody, Wyo.; the diversion of water from Shoshone River, by a dam at Corbett; about 16 miles below the reservoir, and through the Corbett Tunnel into a canal system supplying water to lands on the north side of the river in the vicinity of Ralston, Powell, Garland, Mantua, and Frannie; the diversion into the Willwood Canal for the irrigation of lands on the south side of the Shoshone River; and the diversion into the north side high line from the Shoshone Dam for the irrigation of lands lying on the north side of the Shoshone River above the Garland Canal system and extending from the lower end of the Shoshone Canyon near Cody to the divide between the Shoshone River and Clarks Fork drainage.

The Shoshone Dam, Corbett Dam, Corbett Tunnel, Garland Canal, about 12 miles of the Frannie Canal, and the lateral and distributary system for approximately 45,000 acres in the vicinity of Ralston, Powell, and Garland, Wyo., have been completed with the exception of a few minor structures. These structures are now being built and will be completed the present season.

Future operations include the construction of the high line canal, the Willwood Canal, and the extension of the Frannie Canal to cover lands in the vicinity of Frannie, Wyo.

CONSTRUCTION DURING FISCAL YEAR

Distribution system.—During the past year the structural work in connection with the third unit was completed by force account, and the few remaining small structures within the area of the second unit were completed. Lateral A was constructed by Government forces as far as Station 64 in 1908 and was extended under contract to Station 322 during the fall and winter of 1910. This lateral has an initial capacity of 100 second-feet and reduces to 60 second-feet capacity in the length constructed. It is proposed to extend this lateral to a total length of about 14 miles.

The Frannie Canal, constructed from its intake to Station 650 under contracts completed in May, 1911, has a capacity of 550 second-feet at the head and reduces to 440 second-feet in the length constructed. The canal will irrigate about 8,500 acres in the vicinity of

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Powell, Wyo., and will be extended into the Sage Creek Valley and furnish water to about 30,000 or 40,000 acres in the vicinity of Frannie, Wyo.

The distributing ditches also constructed under contract cover lands north and west of Powell, Wyo., under the constructed portions of the Frannie Canal and Lateral A.

The concrete structures on these canals and laterals are being built by force account and were 33 per cent completed on June 30, 1911. To facilitate the measurement of water, weirs have been constructed at the head of nearly all of the Garland Canal laterals and in many of the distributing ditches. A considerable number of minor structures for protecting ditches against erosion have been constructed.

OPERATION AND MAINTENANCE

During the season of 1910 the Shoshone Dam, Corbett diversion works, Garland Canal, 10 main laterals and 66 distributaries, including 110 miles of canal, were operated, and 275 farms, aggregating 14,700 acres, were irrigated, being an increase of about 5,000 acres over the previous season. At the Corbett diversion works 48,241 acre-feet were diverted from the river, of which 37,548 acre-feet were delivered to the laterals and 30,351 acre-feet to the farms.

At the close of the irrigation season of 1910 repairs were made to several storm water culverts and the outlet culvert of Ralston Reservoir, canal banks were protected with riprap and brush, the outlet tower of Ralston Reservoir was strengthened with a ring of reenforced concrete 1 foot thick and 21 feet high, and canals were cleaned and repaired. The irrigation season of 1911 began on April 20 and the service was prepared to irrigate 34,852 acres of land. On June 30, 1911, 14,580 acres were being irrigated, 21,944 acre-feet of water had been diverted from the Shoshone River, and 12,189 acre-feet had been delivered to the farms. Storage in the reservoir amounted to 280,000 acre-feet.

SETTLEMENT AND IRRIGATION

The settlement on the project indicates a steady and healthy growth. During the fiscal year 59 farm units had been entered with an aggregate area of 3,436 acres and on June 30, 1911, 337 farm units aggregating 19,988 acres had been entered subject to the reclamation act and water-right applications had been received for 520 acres in private ownership. The population of the farms of the project is about 1,500, and the town of Powell is growing rapidly. On June 23 the Ralston unit of the project was opened.

The estimated total value of crops grown in 1910 was about $125,000. Alfalfa was a very successful crop, the acreage being increased from 1,600 to 5,000 acres and three cuttings were obtained. Large acreage was devoted to oats, wheat, and potatoes.

The first cutting of alfalfa for 1911 has been made and indicates that the crop will be heavier than in 1910. All other crops are in better condition than at the same time last year. A large number of apple trees have been set out on the project and are in excellent condition and show a healthy, vigorous growth.

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ORDER DATED FEBRUARY 6, 1911

1. The instructions accompanying the public notices heretofore issued opening to irrigation lands in the Shoshone project, Wyoming, in pursuance of the provisions of the reclamation act of June 17, 1902 (32 Stat., 388), provide that the amount of water to be furnished to be stated in the second paragraph of each water-right application is 3 acre-feet per acre per annum.

2. In accordance with such instructions the water-right application as executed by the water users reads as follows:

"The amount of water to be furnished hereunder shall be 3 acre-feet of water per annum per acre of irrigable land as aforesaid, measured at the land; or so much thereof as shall constitute the proportionate share per acre from the water supply actually available for the lands under said project: *Provided*, That the supply furnished shall be limited to the amount of water beneficially used on said irrigable land."

3. Experience has demonstrated that the quantity of water stated is in excess of the actual needs for beneficial use and that the application of the said quantity of water is having a detrimental effect upon the irrigated lands.

4. It is accordingly hereby ordered that the amount of water to be furnished hereafter shall not exceed 2 acre-feet of water per annum per acre of irrigable land, measured at the land; or so much thereof as shall constitute the proportionate share per acre from the water supply actually available for the lands under said project: *Provided*, That the supply furnished shall be limited to the amount of water beneficially used on said irrigable land.

ORDER DATED MARCH 25, 1911

1. In pursuance of the act of Congress approved February 13, 1911 (Public No. 353), entitled "An act to authorize the Secretary of the Interior to withdraw public notices issued under Section 4 of the reclamation act, and for other purposes," the following order is promulgated for the purpose of relieving the present situation on the Shoshone project, Wyoming, pending the issuance of public notice modifying or abrogating the notices heretofore issued.

2. Action looking to the cancellation of entries and water-right applications for failure to make payments when due shall be deferred until December 1, 1911, and water will be furnished in the irrigation season of 1911 in all cases where payment is made on or before April 30, 1911, of all operation and maintenance charges which have heretofore become due and remain unpaid.

PUBLIC NOTICE DATED MAY 20, 1911

Pursuant to the provisions of section 4 of the reclamation act of June 17, 1902 (32 Stat., 388), notice is hereby given as follows:

1. Water will be furnished from the Shoshone project, Wyoming, under the provisions of the reclamation act in the irrigation season of 1911 for the irrigable lands in the third unit shown on farm-unit plats of T. 55 N., R. 99 W., and Ts. 54 and 55 N., R. 100 W., sixth principal meridian, approved December 10, 1910, by the Secretary of the Interior and on file in the local land office at Lander, Wyo.

2. Homestead entries, accompanied by applications for water rights and the first installment of the charges for building, operation, and maintenance, may be made on and after June 23, 1911, beginning at 12 o'clock m., under the provisions of said act for the farm units shown on said plats. Water-right applications may also be made for lands heretofore entered and for lands in private ownership, and the time when payments will be due therefor is hereinafter stated.

3. Warning is hereby expressly given that no person will be permitted to gain or exercise any right whatever under any settlement or occupation begun prior to July 15, 1911, on any lands shown on said plats: *Provided, however*, That this shall not interfere with any valid existing rights obtained by settlement or entry while the land was subject thereto.

4. The limit of area per entry, representing the acreage which in the opinion of the Secretary of the Interior may be reasonably required for the support of a family on the lands entered subject to the provisions of the reclamation act, is fixed at the amounts shown on the plats for the several farm units. The limit of area for which water-right application may be made for lands in private ownership shall be 160 acres of irrigable land for each landowner.

5. The charges which shall be made for each acre of irrigable land in the said entries and for lands heretofore entered or in private ownership are in two parts, as follows:

(*a*) The building of the irrigation system, $47 per acre of irrigable land, payable in not more than 10 annual installments, each payment not less than $4.70, or some multiple thereof, per acre. Full payment may be made at any time of any balance

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of the building charge remaining due, after certification by the Commissioner of the General Land Office that full and satisfactory compliance has been shown with all the requirements of the law as to residence, cultivation, and reclamation.

(*b*) For operation and maintenance for the irrigation season of 1911 and annually thereafter until further notice, $1 per acre of irrigable land, whether water is used thereon or not. As soon as the data are available the operation and maintenance charges will be fixed in proportion to the amount of water used, with a minimum charge per acre of irrigable land, whether water is used thereon or not.

6. All entries made hereafter for any of the lands described, whether for lands not heretofore entered or for lands covered by prior entries which have been canceled by relinquishment or otherwise, shall be accompanied by applications for water rights in due form, and by the first installment of the charges for building, operation, and maintenance, not less than $5.70 per acre of irrigable land, except where payments have been duly made by the prior applicants and credits therefor duly assigned in writing. The second installment shall become due on December 1 of the following year. Subsequent installments shall become due on December 1 of each year thereafter until fully paid. For lands in private ownership and for lands heretofore entered the first installment of the said charges shall become due on December 1, 1911. The second installment shall be due on December 1, 1912. Subsequent installments shall be due on December 1 of each year thereafter until fully paid.

7. Entries and water-right applications filed in 1912 and subsequent years must, in addition to one full installment of the charges, be accompanied by an amount equal to the portions of the installments of prior years for operation and maintenance which would have been payable had the entry and water-right application been made in 1911.

8. All installments of the charges for all irrigable areas shown on these plats, whether or not water-right application is made therefor or water is used thereon, shall be due and payable as herein provided.

9. On some of the farm units in T. 54 N., R. 100 E., additional areas (shown on the plat inclosed in a square) will be irrigated at a later date by the construction of the high-line canal, at which time water-right applications will be required therefor.

10. The regulation is hereby established that no water will be furnished in any year until the portions for operation and maintenance of all installments then due shall have been paid. Accordingly, no water will be furnished for the irrigation season of 1912 for any lands unless the portion for operation and maintenance of the installment due on December 1, 1911, has been paid, and in like manner no water will be furnished in any subsequent irrigation season until payment has been made of the portions of the installments for operation and maintenance beginning with the year 1911 then remaining due and unpaid.

11. Failure to pay any two installments of the charges when due, whether on entries made subject to the reclamation act or on water-right applications for other lands, shall render such entries and the corresponding water-right applications, if any, or the water-right applications for other lands, subject to cancellation, with the forfeiture of all rights under the reclamation act, as well as of any moneys already paid.

12. All charges must be paid at the local land office at Lander, Wyo. The charges may, however, for the convenience of applicants, be paid to the special fiscal agent of the United States Reclamation Service assigned to the Shoshone project, for transmission to the register and receiver of the local land office on or before the date specified for payment at the local land office, but in case this privilege is availed of the necessary charges for the transportation of the cash, as determined by the special fiscal agent, must accompany the payment of the water-right charges.

PRINCIPAL CURRENT CONTRACTS

The following table contains data relating to the principal contracts in operation or completed during the fiscal year ending June 30, 1911:

Principal contracts, Shoshone project

No.	Date	Contractor	Description	Estimated value	Estimated earnings June 30, 1911	Completion due
120	Sept. 10, 1906	United States Fidelity & Guaranty Co.	Shoshone Dam.....	$469,479.12	$502,027.19	Jan. 31, 1910
314	Feb. 8, 1910	Des Moines Bridge & Iron Co.	Steel highway bridge.	3,828.00	[1] 4,598.84	Mar 31, 1910

[1] Completed.

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FINANCIAL STATUS

Assets and liabilities on June 30, 1911, Shoshone project

ASSETS

Accounts receivable:			
Uncollected miscellaneous		$9.30	
Uncollected water-right building charges		84,714.63	
Uncollected water-right operation and maintenance charges		4,176.37	
			$88,900.30
Inventories:			
Mercantile store		526.62	
Government animals		3,367.33	
Equipment in use	$26,838.70		
Less depreciation	783.34		
		26,055.36	
Storehouse		8,666.88	
Cement		3,773.43	
Iron and steel		1,046.28	
Lumber		3,999.17	
Fuel		36.71	
Local products		2,242.53	
Freight and handling undistributed		945.46	
			50,659.77
Cost of work:			
Building cost	3,697,298.81		
Plus adjustments	10,275.27		
		3,707,574.08	
Less adjustments	3,300.97		
Less accrued revenues	20,424.25		
		23,725.22	
			3,683,848.86
Operation and maintenance cost		64,841.10	
			64,841.10
Total assets			3,888,250.03

LIABILITIES

Investment of the United States:			
Disbursement vouchers	$3,701,952.60		
Transfer vouchers received	111,040.65		
		3,812,993.25	
Collection vouchers	192,627.78		
Transfer vouchers issued	40,116.19		
		232,743.97	
			3,580,249.28
Accounts payable:			
Unpaid labor		4,484.48	
Unpaid purchases		2,902.38	
Unpaid contract estimates		71,545.03	
Unpaid contract holdbacks		15,207.03	
Unpaid freight and express		3,454.33	
Unpaid passenger fares		5.30	
			97,598.55
Repayments accrued:			
Building		172,013.93	
Operation and maintenance		38,388.27	
			210,402.20
Total liabilities			3,888,250.03

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Feature costs to June 30, 1911, Shoshone project

Storage works (Shoshone Dam and Reservoir):		
Lands submerged by reservoir	$199,124.54	
Dam and appurtenances	869,018.93	
Lower outlet tunnel	20,975.96	
Sluice gates	70,435.19	
Upper outlet tunnel	19,715.12	
		$1,179,269.74
High line Canal, examination and survey		29,126.78
Corbett diverting works:		
Corbett Dam	97,467.80	
Corbett Tunnel	1,167,683.83	
Settling basin, dam, spillway, gatehouse, and sluicing tunnel	25,314.16	
		1,290,465.79
Garland Canal and laterals:		
Examination and survey	6,410.41	
Earthwork	655,533.89	
Structures	268,169.73	
		930,114.03
Frannie Canal extension and lateral system:		
Surveys and examination, earthwork	11,488.54	
Surveys and examination, structures	440.32	
		11,928.86
Willwood diverting system:		
Diversion dam surveys	225.00	
Tunnels, surveys	811.00	
		1,036.00
Willwood Canal and laterals		9,942.77
Wagon roads and highways:		
Shoshone Canyon highway	57,011.34	
Shoshone Reservoir highway	51,900.66	
Shoshone Reservoir highway "between Forks" division	1,178.94	
Garland Flats	990.01	
		111,080.95
Telephone system:		
Construction	2,581.44	
Maintenance	487.67	
		3,069.11
Bridges—highway:		
Steel	7,286.50	
Wood	6,535.69	
Concrete	10,477.52	
		24,299.71
Buildings:		
Construction		36,531.96
Irrigable lands:		
Farm unit subdivision		5,775.94
Examination of project as a whole		62,045.46
Inventory of cost-ledger supplies		2,611.71
Total building cost		3,697,298.81
Operation and maintenance:		
Shoshone Dam, reservoir and appurtenances	3,331.43	
Corbett Dam	2.81	
Corbett Tunnel	122.69	
Corbett sluicing tunnel	93.75	
Operation, Garland Canal and distributary system, division 1 to 19, inclusive	21,323.55	
Maintenance, Garland Canal and distributary system, division 1 to 19, inclusive	36,923.11	
Highway bridges, concrete, steel, and wood	74.79	
Buildings	507.83	
Demonstration farm	2,461.14	
		64,841.10
Total building and operation and maintenance, as per debit in cost of work in statement of assets and liabilities		3,762,139.91

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INDEX.

FIRST TO TENTH ANNUAL REPORTS OF THE RECLAMATION SERVICE.

I. June 17 to Dec. 1, 1902; 317 pages, 46 plates, 65 figures. Stock exhausted.
*II. Through the field season of 1903; 550 pages, 49 plates, 56 figures. Cloth, 85 cents.
*III. Through the field season of 1904; 653 pages, 59 plates. Cloth, $1.25.
*IV. Through the field season of 1905; 374 pages, 63 plates. Paper, 80 cents.
*V. Fiscal year 1905–6; 312 pages, 101 plates, 2 figures. Cloth, $1.25.
*VI. Fiscal year 1906–7; 287 pages. Paper, 25 cents.
*VII. Fiscal year 1907–8; 219 pages. Paper, 25 cents.
VIII. Fiscal year 1908–9; 222 pages.
IX. Fiscal year 1909–10; 329 pages. (Includes history of construction to date.)
X. Fiscal year 1910–11; 290 pages. (Includes index Vols. I–X.)

*No copies available for distribution by Reclamation Service; may be purchased from Superintendent of Documents, Government Printing Office, at the price given. I and III each have case of drawings.

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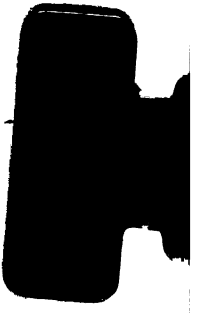

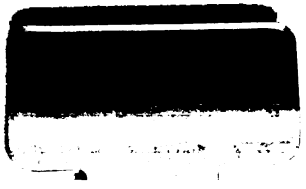

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